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AUTHOR Ingels, Steven J.; And Others
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ABSTRACT

This report profiles the American high school sophomore in the 1989-90 school year using data from the National Education Longitudinal Study. It describes the tested achievement of sophomores in mathematics and patterns of course-taking in mathematics, as well as English, science, and social studies. The report summarizes sophomore reports of how they and their families make decisions about school, work, and college plans. Also examined are sophomores' reports of their future plans, including educational expectations. Just over 11% were not able to perform simple arithmetic operations on whole numbers, but about one-fourth had mastered simple problem solving, but not complex problem solving. Just over 22% had achieved the highest level of mathematics mastery, that is, conceptual understanding and complex problem solving. Geometry and foreign language were among the key "gatekeeper" courses for college admission. Overall, gender differences were small, but students did differ in mathematics achievement by socioeconomic status and by high school program placement. While black and white students had similar educational expectations, blacks were much less likely to have taken geometry and foreign languages. Student characteristics are displayed in 29 tables and 12 figures. Five appendixes present supplemental information. (Contains 69 references.) (SLD)

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National Education Longitudinal Study of 1988

A Profile of the American High School Sophomore in 1990

Steven J. Ingels
Barbara L. Schneider
Leslie A. Scott
National Opinion Research Center

Stephen B. Plank
University of Chicago

Shi-Chang Wu, Project Officer
National Center for Education Statistics

U.S. Department of Education
Office of Educational Research and Improvement NCES 95-086

U.S. Department of Education
Richard W. Riley
Secretary

Office of Educational Research and Improvement
Sharon P. Robinson
Assistant Secretary

National Center for Education Statistics
Emerson J. Elliott
Commissioner

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Contact:
Peggy Quinn
(202) 219–1743

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Highlights

This report profiles the American high school sophomore in the 1989-1990 school year. It describes the tested achievement of sophomores in mathematics and patterns of course-taking in mathematics and also science, English and social studies. The report also summarizes sophomore reports of how they and their families make decisions -- about school matters, whether to work while in high school, and whether to go to college. Finally, this report examines sophomores' reports of their plans for the future, including educational expectations such as college completion. Selected findings are reported below; a comprehensive chapter-by-chapter summary of findings follows the concluding chapter and bibliography of this report.

Overall Achievement: Proficiency in Mathematics

Within the reading and mathematics tests, clusters of test items were identified that were associated with a specific set of skills. For mathematics, the following proficiency levels were defined:

Math Level 1: Simple arithmetic operations on whole numbers.

Math Level 2: Simple operations with decimals, fractions, roots.

Math Level 3: Simple problem solving, requiring conceptual understanding.

Math Level 4: Conceptual understanding and complex problem solving.

The four-level mathematics proficiency score results for spring term 1990 sophomores show that:

- Just over 11 percent of sophomores fell below Level 1, that is, were unable to perform simple arithmetic operations on whole numbers.
- Over one-fourth were able to perform simple arithmetical operations on whole numbers (Level 1), but not (Math Level 2) simple operations with decimals, fractions, and roots.
- A further 15 percent were able to perform arithmetical operations on whole numbers, decimals, fractions and roots (level 2), but could not solve simple problems requiring conceptual understanding.
- About a quarter of spring term 1990 American sophomores had mastered simple problem solving (Level 3) but not complex problem solving (Level 4).
- Finally, just over 22 percent of sophomores showed the highest level (Level 4) of mathematics mastery, that is, conceptual understanding and complex problem solving.

Course-Taking in Key Academic Areas

Geometry and foreign language have been identified as among the key "gatekeeper" courses associated with higher likelihood of admission into (and persistence in) college.

Geometry. Overall, 47 percent of 1990 tenth graders reported having taken geometry by spring term of sophomore year. Among those who expect to complete college or earn graduate or professional degrees, 62 percent had completed a year of geometry, and 38 percent had not.

Foreign Language. Overall, 37 percent of 1990 tenth graders reported having taken two years of foreign language by spring of their sophomore year. Half of those who expect to complete college or earn graduate or professional degrees had done so.

Diffusion of Mathematics Reform

New math instructional standards and curriculum guidelines were published by the National Council of Teachers of Mathematics starting in mid-1989. NELS:88 sophomore data from the 1989-90 school year thus provide a baseline of existing practices, before the effects of the new guidelines could be implemented. The new standards recommend increased emphasis on problem-solving, student discussion and explanation, use of non-textual materials, hands-on material, computers and calculators. While some of these practices were already in use during the 1989-90 school year, they were not widespread--for none of these practices did a majority of students report frequent use.

Problem-Solving Activities:

- Only 30 percent of sophomores reported that they engage in problem-solving activities often--though more than 80 percent do so at least sometimes.

Student-led discussion and oral explanation:

- Some 41 percent of sophomores reported they never participate in student-led discussions in math class; 39 percent reported that they never explain their work to the class orally.

Resources:

- 70 percent of sophomores reported that they never use books in math class other than math texts;
- Fully 69 percent reported never using hands-on material and only 6 percent do so often;
- 84 percent of sophomores reported never using computers;
- Just over a third reported that they use calculators in class frequently, and another 38 percent indicate that they sometimes use calculators.

Equity Concerns: Differences in Course Taking and Instructional Practices by Subgroups

Gender differences:

- Male and female sophomores are equally likely to have completed a year of geometry.
- Female tenth graders are more likely to have taken a full 2 years of foreign language (41 percent of females versus 34 percent of males).

- Except for a small male advantage in the highest math quartile, math test differences by quartile were not statistically significant.

Socioeconomic Status Differences:

- High-SES[1] sophomores are far more likely than low-SES sophomores to have completed a year of geometry (68 percent for high-SES, versus 27 percent for low-SES,).

- The high-SES group is three times as likely to have taken a full 2 years of foreign language in ninth and tenth grade than is the low-SES group (58 percent versus 17 percent).

- High-SES sophomores are more likely to use calculators in math class (40 percent of the highest SES quartile sophomores reported frequent use, compared to 30 percent of the lowest quartile).

- Low-SES sophomores were significantly more likely than high-SES sophomores to report making decisions about what classes they will take entirely on their own, that is, without parental input. The majority (56.2 percent) of low-SES sophomores reported making course selection decisions entirely on their own, while the majority of high-SES sophomores (63.3 percent) reported making such decisions either together with their parents (27.4 percent) or after consultation with their parents 35.9 percent).

- Low-SES sophomores were also significantly more likely than high-SES sophomores to report that they do not know what their counselors would advise them to do with their futures (30 percent versus 19 percent).

- 52 percent of sophomores in the lowest SES quartile reported that their counselors would advise them to attend college. 72 percent of sophomores in the highest SES quartile reported the same.

- 47 percent of sophomores in the lowest SES quartile reported that their mothers want them to complete college or graduate school. In contrast, 84 percent or sophomores in the highest SES quartile reported that their mothers want them to complete college or graduate school.

Differences in Mathematics Proficiency by High School Program Placement

- Sophomores who reported themselves to be in the academic track were more than six times as likely to score in the highest math proficiency level than were those who reported themselves to be in the vocational track (38 percent versus 6 percent).

- Sophomores in the academic track were more than twice as likely (38 percent versus 18 percent) to demonstrate mastery of the highest math proficiency level than were sophomores in the general track.

- Over a fifth of sophomores who reported themselves to be in the vocational track failed to show mastery of simple arithmetic operations on whole numbers (that is, were below Level 1). For academic track sophomores, about 4 percent were below math Level 1.

[1]In this report, "high SES" and "highest SES quartile" are used interchangeably, as are "low SES" and "lowest SES quartile".

Black-White Differences in Expectations/Preparation/Achievement

Black and white sophomores reported similar expectations for completing college. However, this similarity in expectations contrasts with disparities between the two groups in course taking and tested mathematics achievement. Specifically:

- Some 61 percent of whites and 59 percent of blacks expect to complete at least a four year college degree.

- About half of white sophomores (49.8 percent) have completed a year or more of geometry, as compared to just over a third of black sophomores (37.7 percent).

- Some 40 percent of white sophomores and 27 percent of black sophomores had completed two years of a foreign language.

- In terms of tested sophomore mathematics achievement, whites are almost five times more likely to fall into the advanced proficiency group (those who displayed mastery of conceptual understanding and complex problem solving in mathematics) than are blacks (26.5 percent for whites and 5.8 percent for blacks). White sophomores are four times more likely to score in the highest math quartile than are black sophomores (32 percent versus 8 percent).

Thus, while black and white sophomores reported similar college completion expectations, blacks are somewhat less likely to have taken key college "gatekeeper" courses (such as a year of geometry and two years of foreign language) and are strikingly less likely to score high on mathematics achievement tests.

FOREWORD

The National Education Longitudinal Study of 1988 (NELS:88) provides a wealth of information about factors that influence student academic performance and social development and the processes through which these factors operate. Under the sponsorship of the National Center for Education Statistics (NCES), with additional support from the National Science Foundation (NSF), the Office of Bilingual Education and Minority Languages Affairs (OBEMLA), and other entities and agencies, NELS:88 is being conducted in several waves.

The first wave (the 1988 base year) recorded the experiences of a nationally representative sample of 26,432 eighth graders within a nationally representative sample of 1,052 of their schools. The second wave (the 1990 first follow-up, which provides the basis for this report) traced them to the tenth grade. A sample of around 1400 high schools enrolling 1988 eighth graders in 1990 was drawn, and a sample of 20,542 students and dropouts pursued in the second wave of data collection. The third wave (the 1992 second follow-up) followed them to the twelfth grade, while the fourth wave (the 1994 third follow-up) will follow them out of high school. The longitudinal design of NELS:88 permits researchers not only to observe the critical transition of students from middle or junior high school to high school, but also to identify early student, school, and parental experiences that promote student learning. This report delineates the experiences of spring 1990 sophomores, particularly with respect to their learning and achievement in mathematics, as well as science, reading, and social studies; the processes by which they make choices about school classes, postsecondary education, and employment; and their plans for the future, particularly their educational expectations, their plans for taking the standard college entrance exams, and their perception of the expectations their counselors and families hold for them.

In order to produce a reasonably concise report in which tenth graders speak largely for themselves, ***A Profile of the American High School Sophomore in 1990*** relies primarily on data gathered from students. Nevertheless, readers should be aware that NELS:88 takes into consideration the much larger environment in which the student functions and develops. Thus, in addition to student test and self-report data, NELS:88 incorporates supporting data from students' school principals, parents, and teachers to identify additional factors that affect student achievement. NELS:88 also incorporates archival sources such as high school transcripts that record grades and course-taking patterns.

It is our hope that this report will be of interest to policymakers and educational practitioners, as well as to education researchers. Policymakers can use NELS:88 results to turn statistics into practical, workable programs to help solve the problems facing the American educational system and its students. Researchers may be inspired by this report to use NELS:88 data to explore their own interests and concerns, and to thereby further illuminate the condition and prospects of American secondary education.

Paul Planchon
Associate Commissioner of Education Statistics

Jeffrey Owings
Chief, Longitudinal and Household Studies Branch

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The NELS:88 Technical Review Panel advised the National Center for Education Statistics' contractor for NELS:88--the National Opinion Research Center (NORC) at the University of Chicago--on design and questionnaire development issues. Members of the panel were Jerald G. Bachman, Program Director and Research Scientist, Institute for Social Research, University of Michigan; Gordon Ensign, Supervisor, Testing and Evaluation, State of Washington; Lyle V. Jones, Director, L.L. Thurstone Psychometric Laboratory, University of North Carolina; Nancy L. Karweit, Principal Research Scientist, Center for Social Organization of Schools, Johns Hopkins University; Patricia Shell, formerly the Superintendent of the Brazosport Independent School District, Freeport, Texas; Marshall L. Smith, Dean, College of Education, Stanford University; Richard J. Murnane, Associate Professor of Education, Harvard University; and John Stiglmeier, formerly the Director of the Information Center on Education, New York State Department of Education. In addition, the following individuals served the study as consultants: Anthony Bryk of the University of Chicago, Senta Raizen of the National Center for Improving Science Education, and Aaron Pallas of Michigan State University. Finally, numerous researchers shared their measures and offered their guidance on specific points of questionnaire design.

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INTRODUCTION

PURPOSE OF NELS:88

The major features of NELS:88 include the planned integration of student, dropout, parent, teacher, and school studies; initial concentration on an eighth-grade cohort with follow-ups at two-year intervals; inclusion of supplementary components to support analyses of demographically distinct subgroups; and design linkages to previous longitudinal studies and other current studies. Multiple research and policy objectives are addressed through the NELS:88 design. The study is intended to produce a general purpose dataset for the development and evaluation of educational policy at all government levels. Part of its aim is to inform decision makers, education practitioners, and parents about the changes in the operation of the educational system over time and the effects of various elements of the system on the lives of the individuals who pass through it. Specifically, NELS:88 focuses on a number of interrelated policy issues, including:

- students' academic growth over time, and the family, community, school, and classroom factors that promote or inhibit student learning;
- the transition of different types of students from eighth grade to secondary school (and later, from secondary school to postsecondary education or the labor force);
- the influence of ability grouping and differential course-taking opportunities on future educational experiences and outcomes;
- determinants and consequences of dropping out of (and of returning to) the educational system;
- changes in educational practices over time; and
- the role of the school in helping the disadvantaged and the school experiences and academic performance of language-minority students.

BASE YEAR DESIGN

The base year survey was conducted in the spring term of the 1987-1988 school year. A clustered, stratified national probability sample of 1,052 public and private eighth-grade schools participated. Almost 25,000 students across the United States participated in the base year study. The sample represents the nation's eighth-grade population, totalling over 3 million eighth graders in more than 38,000 schools in spring 1988.

Questionnaires and cognitive tests were administered to each selected student. The student questionnaire inquired about school experiences, activities, attitudes, self-concept, plans, selected background characteristics, and language proficiency. The school principal completed a questionnaire about the school; two teachers of each student were asked to answer questions about the student, about themselves, and about their school; and one parent of each student was surveyed about family characteristics and student activities.

FIRST FOLLOW-UP DESIGN

The first follow-up survey was conducted primarily in the spring term of the 1989-1990 school year. As in the base year, students were asked to complete a questionnaire and cognitive test. The cognitive test was designed to measure tenth-grade achievement and cognitive growth between 1988 and 1990 in the subject areas of mathematics, science, reading, and social studies (history/geography/civics).

The first follow-up of NELS:88 comprised the same components as the base year study, with the exception of the parent survey, and a freshened sample was added to the student component to achieve a representative sample of the nation's sophomores. Some 18,221 students participated (of 19,363 selected), with 1,043 dropouts taking part (of 1,161 identified), for a total of 19,264 participating students and dropouts. In addition, 1,291 principals took part in the study, as did 9,987 teachers.

A more detailed description of the NCES National Education Longitudinal Studies program in general, and of the NELS:88 first follow-up in particular, is provided in Appendix C of this report.

LEVELS OF ANALYSIS SUPPORTED BY NELS:88 DATA

The NELS:88 first follow-up sample was designed to support several different levels of analysis. One level is longitudinal analysis, in which changes from the 1988 baseline are measured 2 years later, in the spring term of 1990. Longitudinal analysis can involve repeated measures of the same outcome--for example, test data can be used to measure growth in academic achievement over time. Or longitudinal analysis can look at how conditions at an earlier time point are predictive of outcomes at a later time point--for example, one might examine how eighth graders with various "risk factors" (for example, coming from a low-income home, having parents who did not finish high school, and so on) fared two years later (for example, what proportion had dropped out, repeated a grade, and so on).

A second level of analysis is cross-sectional. Because the longitudinal sample has been "freshened" with 1990 sophomores who were not in eighth grade in the United States in the 1987-1988 school year, it is a representative sample of the nation's spring-term 1990 sophomores.

Finally, by maintaining a degree of comparability in questionnaire and test measures employed, NELS:88 first follow-up results will support comparisons with HS&B sophomores of 1980.

A report has been prepared to illustrate each of these three levels of analysis--longitudinal, cross-sectional, and repeated cross-sectional--of NELS:88 first follow-up data.

The report ***Two Years Later: Cognitive Gains and School Transitions of NELS:88 Eighth Graders*** illustrates cross-wave (longitudinal) analysis of the NELS:88 data. It examines the changes that eighth graders underwent between 1988 and 1990 and suggests the pattern of stability and change that characterized their transition to high school. Information is also given about the characteristics of 1988 eighth graders who subsequently dropped out of school, and achievement gains as measured by the NELS:88 cognitive test battery are reported in detail.

This descriptive summary--***A Profile of the American High School Sophomore in 1990***--illustrates the cross-sectional level of analysis, which, as it were, takes a snapshot at a single point in time. This report describes the learning and achievement, decision making, and educational expectations of the nation's spring 1990 sophomores. It is the second of a series of three cross-sectional reports on the in-

school cohorts of NELS:88, the first of which was ***A Profile of the American Eighth Grader***, and the third of which is ***A Profile of the American High School Senior in 1992***.

America's High School Sophomores: A Ten Year Comparison, 1980 - 1990 illustrates an intercohort or repeated cross sectional approach. The report compares 1980 HS&B sophomores to 1990 NELS:88 sophomores. It identifies changes over this 10-year span in in-school and out-of-school activities, academic achievement, self-concept and values, and plans and aspirations of the nation's tenth graders.

Many topics of potential interest have not been addressed in this report because they are the subject of other analysis reports. A complete listing of NELS:88 statistical analysis publications sponsored by the Office of Educational Research and Improvement appears in Appendix E. The appendix also includes an abstract of each report, so that readers can obtain a sense of the content reported.

DESCRIPTIVE FOCUS OF THIS REPORT

NELS:88 data can be used in two distinct ways. One use of NELS:88 data is descriptive and aims at estimation--specifically, the estimation of descriptive and relational population and subgroup statistics. Such descriptive data are usually expressed as means or proportions and answer questions about the size and distribution of educational phenomena or about the characteristics of students and the educational system. For example, descriptive data tell us how many sophomores were enrolled in spring term 1990, and how much coursework the average sophomore had completed. Descriptive data tell us how many students are proficient in higher level mathematical operations, and whether there are differences in proficiency levels by type of school attended or by racial and ethnic characteristics or by the amount of homework typically completed. Such data tell us how many students have dropped out of school, and who they are--that is, whether males drop out at a higher rate than females, or how much more likely high achievement students are to stay in school. But descriptive accounts, while they answer the question "how many", cannot conclusively answer the question "why". A second way of using the data, however, can address such questions.

NELS:88 was designed to serve the purposes of research and policy analysis, as well as to provide basic descriptive data about the functioning of the education system. This report is descriptive in nature.[2] It attempts to provide a statistical profile of the American high school sophomore in the 1989-1990 school year. It does so by describing the course taking, the tested achievement, the educational expectations, decision-making, and the in-school and out-of-school activities of the nation's tenth graders.

ORGANIZATION OF THIS REPORT

Chapter 1 provides an in-depth view of tenth-grade learning and achievement in mathematics. *Chapter 2* supplies a summary of tenth-grade learning and achievement in science, reading, and social studies, as well as foreign language course taking. *Chapter 3* explores the tenth grader's life outside of

[2]Of course prior research provides a context for interpreting descriptive results -- for example, past studies have demonstrated that there is a strong quantitative (how much coursework) as well as qualitative (content of the coursework) relationship between course taking and achievement. This context is drawn upon throughout this report.

school, including the process of educational decision making. *Chapter 4* reports on sophomores' plans for the future, including their educational expectations and aspirations.

Taken together, these four chapters provide a statistical profile of the American high school sophomore in 1990, which is summarized in *Chapter 5*. Appendices A and B provide technical notes and tables of standard errors of measurement and sample sizes for all reported population estimates. Appendix C contains further information about NELS:88 in general and the first follow-up in particular. Appendix D presents additional tabulations on reading and social studies achievement, while Appendix E is a bibliography of OERI-sponsored NELS:88 publications that includes a content abstract for each report.

Comparisons cited in this report have been tested for statistical significance using Bonferroni adjustments and are significant at the .05 level. (The overall alpha is adjusted, based on the number of possible comparisons; see Appendix B for a discussion of procedures used.)

THE NELS:88 SOPHOMORE COHORT: BACKGROUND CHARACTERISTICS

Before examining in detail the learning and achievement, outside-school activities, decision making, and educational expectations of America's 1990 sophomores, it may be useful to review some of their basic background characteristics, as displayed in Table I.1.

Just over three-fifths of the 1990 sophomores come from "traditional" families in which both the mother and father are present. Some 90 percent of them attend public schools.

The cohort is evenly split between males and females. The cohort is 72.5 percent non-Hispanic white, 12.5 percent non-Hispanic black, 10.2 percent Hispanic, 3.9 percent Asian, and just over 1 percent American Indian. Because some students have dropped out of school and different racial/ethnic groups have different dropout rates, the racial proportions of sophomores are somewhat different from those found by viewing the NELS:88 sample as a whole.

Most members of the cohort turned 16 in the course of 1990, although more than one-third turned 17 or 18 in that year. Not all cohort members knew their mother's highest level of education--11 percent did not.[3] Based on responses from the 89 percent who did know, about 34 percent of the total cohort had mothers who had gone no farther than high school graduation, while 13 percent had mothers who had not completed high school. Some 21.5 percent indicated that their mothers had a college degree or higher (includes college graduate, MA or equivalent, or Ph.D. or equivalent).

Several of these characteristics--in particular, race/ethnicity, gender, and the control type (public, Catholic, and so on) of the school attended in 1990--are systematically employed in the tables in this report to define groups and explore differences among their members on key measures of interest. In addition, a composite measure of socioeconomic status that includes parents' educational attainment and occupational status and family income or household items is also systematically employed in this way, as are, from time to time, other variables such as family composition and sophomores' expectations of completing college.

[3] NELS:88 collects data from multiple sources and the base year parent questionnaire also inquired into the highest level of maternal and paternal education. Mother's and father's highest level of education completed was missing less than one percent of the time on the parent data file.

Table I-1–Selected Background Characteristics of 1990 Sophomores

	1990 Sophomores
Race/Ethnicity	
Asian	3.9%
Hispanic	10.2
Black	12.5
White	72.2
American Indian	1.2
School Control	
Public	90.1%
Catholic	6.0
Independent (NAIS)	1.2
Other private	2.7
Gender	
Male	49.9%
Female	50.1
Family Composition	
Mother & father	62.4%
Mother & male guardian	12.9
Father & female guardian	3.3
Mother only	14.7
Father only	3.1
Other relative/nonrelative	3.5
Year of Birth	
1972 or before	4.0%
1973	30.1
1974 or after	65.9
Mother's Education	
Less than HS	13.1%
HS graduate	33.6
Some college	20.7
College graduate	13.0
MA or equivalent	6.4
Ph.D. or equivalent	2.1
Don't know	11.0

Note: Owing to rounding, some subcategories may not sum to 100 percent.

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

CHAPTER 1: MATHEMATICS LEARNING AND ACHIEVEMENT OF 1990 SOPHOMORES

Mathematics achievement and standards are currently of considerable national interest, an interest spurred in part by a drive to be competitive in a global economy and by evidence of lagging performance of American students on the mathematical components of international assessments.[1] In the 1981-82 Second International Mathematics Study (SIMS), U.S. students scored below the international average for the 20 participating nations on geometry and measurement, though above average on statistics. Analysts of the SIMS data observed that the time invested in mathematics by American students is "largely devoted to mastery of the computational skills which would have been needed by a shopkeeper in the year 1940--skills needed by virtually no one today" (McKnight et al., 1987).

In the first International Assessment of Educational Progress in 1988, U.S. 13-year-olds scored among the lowest in mathematics among a group of countries and Canadian provinces (Lapointe, Mead, & Phillips, 1989). In the second International Assessment of Educational Progress in 1991, 13-year-olds from the United States and Spain scored lower in math on average than students from the other populous countries tested (Korea, Taiwan, the Soviet Union, France, and Canada) (Lapointe, Askew, & Mead, 1992). In the same study, American 9-year-olds scored below their peers in 11 of 14 nations.

The tested achievement of American students in mathematics may be compared not only to the accomplishments of their contemporaries in other countries, but also to the achievement of earlier cohorts of American students. For example, sophomore mathematics achievement in 1980 (as measured by HS&B) may be compared to sophomore achievement in 1990 (as measured by NELS:88).[2] This 10-year comparison shows that there have been measurable changes in mathematics achievement. Overall, 1990 sophomores performed modestly better than did the 1980 cohort. Moreover, the gap between the math performance of traditionally higher achieving Asians and whites, on the one hand, and that of blacks and Hispanics, on the other, had narrowed somewhat by 1990. Specifics follow:

- Between 1980 and 1990, sophomores gained in mathematics achievement.[3]
- White and Asian math achievement continued to be higher, though black and Hispanic students closed some of the gap by showing proportionately greater gains in math in 1990 than did their white or Asian counterparts.
- While both male and female sophomores had higher tested math achievement in 1990 than in 1980, the increases were essentially equal for both groups--that is, the amount of gain was the same for males and for females.

The National Assessment of Educational Progress (NAEP) does not assess sophomores as such. However, NAEP supplies rich trend data for 13-and 17-year-olds, the two age groups that effectively bracket the

[1]For a summary of findings from international mathematics and science assessments in recent years and an examination of the statistical limitations and uses of such findings, see Medrich and Griffith, 1992 (see the bibliography of this report for a full citation).

[2]HS&B-NELS:88 comparisons are taken from Rasinski, Ingels, Rock and Pollack, 1993 (*America's High School Sophomores: A Ten Year Comparison, 1980-1990*, Washington, D.C.: National Center for Education Statistics (NCES 93-087).

[3]Specifically, 1990 sophomores are performing 26 percent of a standard deviation higher on the math test than their comparable cohorts from 1980 (after standardizing, HS&B mean = 32.81; NELS:88 mean = 35.97).

sophomore cohort (at the time of being surveyed in the spring term of 1990, the modal age for sophomores was 15). NAEP data[4] show the following:

- Overall, for both 13- and 17-year-olds, average mathematics proficiency was higher in 1990 than in 1978.
- Overall, for 13-year-olds, average mathematics proficiency was higher in 1990 than in 1973, though for 17-year-olds it was the same.
- At age 13 both black and Hispanic students showed significant gains from 1973 to 1990. The performance of white 13-year-olds in 1990 was the same as in 1973.
- At age 17, white students showed an increase in average mathematics proficiency from 1982 to 1990 following a decline from 1973 to 1982. Black 17-year-olds had a higher average proficiency in mathematics in 1990 than in 1973. There was no significant change in average math proficiency of Hispanic 17 year olds during the period.
- At ages 13 and 17, white students in 1990 continued to have a higher average mathematics proficiency than black or Hispanic students.

In general, NAEP data show that while there have been improvements in overall mathematics performance, and while some demographic subgroups have shown disproportionate (albeit comparatively modest) gains, mathematics learning remains highly unequal across demographic subpopulations, and improvements in basic skills and knowledge have not been matched by improvements in higher-order thinking skills. Despite some improvements over time, it is highly doubtful whether American high school students have realized their full potential to analyze, synthesize, and evaluate mathematical data. The need and desire for fundamental improvement in mathematical understanding forms the backdrop for the examination of practices and achievement that follows.

Efforts at school improvement--in particular, such reforms as increasing the number of courses taken in key subjects such as mathematics, making the content of such courses more rigorous, and improving the methods by which such courses are taught--have been a prominent feature of the years in which NELS:88 sample members passed through middle and junior high schools and on into high school.[5] It is therefore of particular interest to examine how much American tenth graders have achieved in mathematics, what sociodemographic characteristics mark differences between those who have high achievement levels and those who do not, and the extent to which changes that have or can be made to occur in the learning environment may promote more effective schools and in turn improved mathematics learning.

[4]These data are taken from Mullis, Dossey, Foertsch, Jones and Gentile, 1991; see the bibliography of this report for a full citation. These trends are graphed on p. 62 (Fig. 4.1) and p. 64 (Fig. 4.2).

[5]Data reported by the Council of Chief State School Officers (CCSSO, 1992) suggest that, prior to 1987, math and science reform efforts focused on increasing high-school graduation and teacher certification requirements, while since 1987, reforms have emphasized curriculum, instructional techniques, and alternative assessments of student knowledge. To the extent that this is the case, the post-1987 initiatives might be expected to have had much less opportunity to influence the school life of 1990 sophomores than the earlier reform initiatives.

An examination of three facets of the school experience and achievement of 1990 sophomores in mathematics will illustrate the kinds of questions and issues that NELS:88 data address. These three facets, and the principal questions attached to each of them, are sketched below:

Mathematics Course Taking

- Curriculum exposure--What math courses have sophomores taken?
- Equity--Who takes "gatekeeper" courses in mathematics?

Instructional Practices

- Classroom practices--What resources and activities are employed in the tenth-grade mathematics classroom?
- Equity: Are there group differences in exposure to particular classroom practices?
- Instructional emphasis--In the sophomore's view what objectives do teachers stress in the classroom?

Tested Achievement

- Background factors--Are there differences in the tested achievement of key demographic subgroups?
- Instructional factors--How do curriculum exposure and classroom practice relate to test scores?

Mathematics Course Taking. First, it will be of interest to examine *the math courses that sophomores have taken since eighth grade, as well as the characteristics of the course takers*. Although most sophomores are still enrolled in math, there is great variation in the kinds of mathematics courses they have taken. In turn, there are also important differences in the rigor or academic content found across the diversity of mathematics courses that sophomores have been exposed to. Finally, there are important differences in the racial/ethnic, socioeconomic status, and school sector characteristics of those who enroll in the different kinds of math classes, including college preparatory mathematics.

Instructional Practices. Second, it will be of interest to examine student reports of the *instructional practices* or activities employed in their classrooms and the resources available to support those practices, as well as reports of sophomores' perceptions of the *objectives* their teachers emphasize in class. The 1989 National Council of Teachers of Mathematics professional standards for mathematics instruction provide a model of reformed mathematics teaching. NELS:88 data provide a 1990 benchmark for gauging the pace and direction of instructional change in the future, complemented by 1990 NAEP data[6] on other grade levels.

[6]Teacher and student data from the 1990 NAEP point to largely similar findings for eighth graders concerning use of calculators and computers in math classrooms and use of instructional materials and resources. See Mullis, Dossey, Owen, and Phillips, 1991.

Tested Achievement. Third, it will be of interest to examine *mathematics achievement*, as measured by the NELS:88 cognitive test battery, in relation to such *student background factors* as sex and race[7], family socioeconomic status, and control type of school attended. Likewise, it will be of interest to examine mathematics achievement in relation to alterable *curricular and instructional factors*, such as amount of advanced math coursework taken and the teacher's instructional techniques and classroom emphases.

1.1 COURSE TAKING

In this section, we will first explore the kind and amount of mathematics coursework sophomores completed during ninth and tenth grade. Then we will investigate subgroup differences in the opportunity to learn mathematics. We will accomplish this by examining which students or groups of students have taken a year of geometry and by comparing students who have completed low-level, medium-level, and high-level math course sequences.

1.1.1 What math courses have sophomores taken?

Even though course titles can mean different things in different schools and content for courses with the same names may vary considerably from place to place, course enrollment reports do provide an approximate measure of exposure to mathematical contents and concepts. The general tendency of school reform has been to de-emphasize electives and place added emphasis--both in terms of numbers of courses taken and the rigor of the content of those courses--on academic subjects such as mathematics. Since the 1983 publication of ***A Nation at Risk***, 42 of the 50 states have raised their high school graduation requirements, with math one of the subjects most strongly affected by increased requirements, and 47 states have mandated student testing standards (Coley & Goertz, 1990; Medrich, Brown, & Henke, 1992).

Over and beyond what may be required as a minimum for graduation in any given state--or in a given district or school (local requirements often exceed those of the state)--the National Council of Teachers of Mathematics recommends that 3 years of mathematics courses be completed by every high school student, regardless of ability level, with a fourth year recommended for the college-bound. In 1990[8] math course completion statistics for high school graduates just met this recommendation (Legum et al., 1993, Table 14), reflecting an increase in the amount of mathematics coursework completed by secondary school students over the course of the 1980s. The mean number of math credits earned by High School and Beyond seniors in 1982 was 2.45, while the mean for seniors in 1990 was 3.11. Students are more likely to complete a cognitively demanding mathematics course as well. For example, more students now complete a one year course in geometry than did so when the HS&B data were collected (transcript

[7]The following race/ethnicity categories are used in this report: Asian (includes Pacific Islanders and Native Hawaiians); Hispanic (may be of any race); black; white; and American Indian (includes Native Alaskans such as Aleuts).

[8]The NAEP 1990 High School Transcript Study and the 1992 NELS:88 Academic Transcript Study provide additional information about recent course-taking trends. Summaries of course-taking trends through 1992 appear in *The Condition of Education, 1994* (NCES, 1994), pp. 72-79. Readers are cautioned that secondary school transcripts offer a more objective and reliable measure of curriculum exposure and grades than do the student self-reports utilized in this analysis. (See Fetters, Stowe, and Owings, 1984, for comparisons of transcripts and self-report data.)

data show that 45.7 percent of HS&B 1982 seniors had completed a year of geometry, as compared to 64.7 percent of 1990 seniors).[9]

In 1988 the majority of eighth graders (58 percent) were enrolled in regular math, with about a third enrolled in more demanding math courses such as pre-algebra or algebra and 5 percent in remedial math (Hafner, Ingels, Schneider, & Stevenson 1990). In 1990, the overwhelming majority of tenth graders were still enrolled in math (between 3 and 4 percent of sophomores reported that they were *not* enrolled in mathematics during the 1989-1990 school year), and reported taking a wide variety of math courses in ninth and tenth grade. Math courses ranged from general and business math, to various levels of algebra and geometry, and even to trigonometry, precalculus, and calculus.

The fact of widespread enrollment in math cannot automatically be assumed to reflect a high level of commitment to mathematics learning, as evidenced behaviorally by factors such as time spent on homework or out-of-class study. Enrollment in a course does not automatically ensure either that teachers will make exacting demands or that students will exhibit a high level of commitment to mastering its contents. The findings that of sophomores who are enrolled in mathematics, more than 70 percent report that they spend less than 1 hour on math homework in school per week and more than 60 percent report that they spend less than 1 hour on math homework outside school each week underscore this fact with some force.[10]

Nonetheless, past studies have demonstrated that there is a strong positive relationship between the quantity of coursework taken and achievement.[11] While there is little variation in whether sophomores are taking mathematics, there is great variation in the kind of math they have taken since leaving eighth grade. If the quantity of mathematics taken is important, so too is the kind of mathematics--for example, how much *advanced* coursework has been taken.[12]

Although the high school math curriculum tends not to be explicitly tracked by course level into the regular, remedial, and advanced courses that are typical at eighth grade, the diverse math courses offered in high school are associated with a hierarchy of levels of cognitive demand. Indeed, mathematics far more than certain other subjects (for example, English) is highly sequential, and mastery of specific skills is associated with progression through the sequence of offerings. Moreover, some high school students take a general mathematics sequence; others, a college-preparatory sequence. Hence some tenth graders have been enrolled in less intellectually demanding mathematics courses such as general math,

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[9]These comparisons are taken from Legum et al., 1993 Tables 14 and 37. Standard errors for each estimate appear parenthetically: mean number of credits earned in math: 1982, 2.45 (0.02); 1990, 3.11 (0.03). Percentage of seniors completing a year course in geometry: 1982, 45.7 percent (0.79); 1990, 64.7 percent (1.30).

[10]Amount of math homework should be viewed in the context of total homework. Only about half of all sophomores reported completing 5 or more hours of homework per week in all subjects combined, both in and out of school. While to some degree amount of time spent on homework may reflect individual commitment, hours spent on homework varies also by amount of homework assigned, which tends to be greater for students in the academic track and for students enrolled in more advanced mathematics courses.

[11]In particular, see Schmidt (1983), who employed NLS-72 data to analyze the relationship between tested achievement and quantity of instruction, and Walberg and Shanahan (1983), whose analyses of HS&B data found semesters of coursework to be the alterable variable most strongly related to academic achievement.

[12]Evidence for this may be found in other analyses of the NELS:88 first follow-up data. Owings and Lee (1993) found that even after controlling for eighth grade mathematics proficiency, higher math gains were associated with course taking patterns that reflected advanced level math courses (that is, geometry, algebra II, trigonometry, precalculus, or calculus).

while others have taken algebra, geometry, or yet more advanced math courses. As can be seen from the student questionnaire response frequencies below[13], around half of tenth graders had not taken geometry by spring term of sophomore year, more than 30 percent had taken no algebra since leaving eighth grade, while around 62 percent had completed at least a year of algebra. (However, some of the students who reported no algebra for ninth and tenth grade may have completed algebra in eighth grade.) Very few have taken advanced math courses such as trigonometry, precalculus, or calculus at this stage in their high school careers.

Table 1.1 Self-Reported Ninth-and Tenth-Grade Mathematics Coursework Taken by Spring Term 1990 Sophomores

	None	1/2 year	1 year	More than 1 year
General math	70.9%	3.0%	16.4%	9.7%
Business math	90.5	2.7	5.9	1.0
Prealgebra	66.7	5.6	24.5	3.2
Algebra I	30.0	6.8	57.5	5.7
Geometry	48.1	5.1	45.4	1.4
Algebra II	72.4	4.6	22.3	.8
Trigonometry	92.6	3.8	3.1	.5
Precalculus	97.7	.9	1.1	.3
Calculus	98.3	.5	.9	.3
Other math	91.5	2.1	4.5	1.8

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up (1990) Student Survey, U.S. Department of Education, National Center for Education Statistics.

This wide variation in course-taking reflects several factors. One such factor is prior educational experience--some students were selected to take (or opted to take) algebra in eighth grade, others were not. Another such factor is the greater amount of student choice in programs and in specific subject-taking in high school. Curriculum placement--whether a student is in an academic, general, or vocational program--may account for much of the quantitatively and qualitatively differential course-taking of high school sophomores. Enrollment or placement in the academic/college preparatory curriculum is associated both with completion of a greater number of course units in mathematics, and with enrollment in cognitively more demanding math courses than is the case for those placed in vocational or general programs. (Moreover, it is often argued [see, for example, Oakes 1985] that a student's program placement influences his or her wider learning environment and its opportunities, as well as the specific instructional practices to which the student will be exposed.) In their analyses of HS&B data, Ekstrom, Goertz and Rock (1988) found curriculum placement to influence course taking (students in the academic curriculum took half a year more math than *comparable* students in other curricula) and amount of homework completed per week, as well as rate of cognitive growth in mathematics.

[13]Percentages differ slightly from the codebook weighted percentages presented in the first follow-up student user's manual because the latter reflect both sophomores and 1988 eighth-grade cohort members who were held back one or more grades or who skipped grades and were therefore not 1990 sophomores.

1.1.2 Who takes "gatekeeper" courses?

Given the educational objective of eliminating racial, economic, and gender inequities in high school achievement--and in subsequent entry into and persistence in postsecondary education--it is important to examine students' patterns of curriculum participation. Both the amount and the rigor or quality of coursework taken are important to academic achievement. Later in this chapter we report data that measure the relationship between completion of a course sequence in advanced math and tested achievement. How much and what kind of courses have been completed may influence not just test scores but other educational outcomes as well, such as entry into college. To the extent that course-taking choices are manipulable or alterable, that is, can be influenced or changed, they become especially relevant to policy. Instructional practices, too, will make results more inequitable if there is variation in the populations exposed to the most effective practices. Findings from NELS:88's predecessor study, HS&B, illustrate how specific coursework may affect subsequent educational outcomes.

In their investigation of factors increasing access to college, Pelavin and Kane (1990) employed HS&B high school transcript data in conjunction with information on college attendance obtained in later rounds. They found that there were certain "gatekeeper courses"--in particular, geometry, and foreign language[14]--that were strongly associated with college attendance (even more so than was type of academic program in which a student was enrolled). Moreover, the gap in college enrollment between white students on the one hand and black and Hispanic students on the other and between poor students and those from more prosperous families was greatly reduced among the students who had taken these courses. Specifically, Pelavin and Kane found:

- About 40 percent of white students took geometry, but only 19 percent of black students and 17 percent of Hispanic students did so. About 25 percent of lower income students took geometry in comparison with 51 percent of students in the highest income group.

- More than 80 percent of black students who took geometry attended college within 4 years of high school graduation; the rate was 82 percent for Hispanic students who took geometry, and 83 percent for white students taking this course. *The gap between* [black and Hispanic] *minorities and whites virtually disappears among students who took geometry.*

- About 71 percent of students from the lowest income group who took geometry attended college within 4 years of high school graduation in comparison with 88 percent of students from the highest income group who took the course (Pelavin & Kane, 1990, p. 76).

Geometry was found to be related not just to the likelihood of college attendance, but also to persistence--that is, to whether a student completed college. Indeed, Pelavin and Kane reported that only 1 student in 20 who had less than a year of geometry "attained a bachelor's degree or college senior status

[14]Other courses to which a gatekeeper role often is attributed include algebra (especially at eighth grade) and laboratory science. On the basis of their analyses of HS&B data (HS&B did not begin until tenth grade), Pelavin and Kane found geometry and foreign language to be the two most powerful course predictors of later postsecondary entry. It should be noted that within hierarchically sequenced course domains such as mathematics, certain courses act not only as gatekeepers for higher education, but also as gatekeepers for enrollment in other critical courses, and that placements (or choices) prior to high school are associated with advanced course-taking in high school. (Thus, for example, Hoffer and Thomas, analyzing data from the Longitudinal Study of American Youth, report that 88 percent of 1993 seniors taking calculus completed a first course in algebra in eighth grade.)

Table 1.2
Mathematics Coursework Level by Background Characteristics

	LEVEL		
	Low[a]	Middle[b]	Advanced[c]
Total	24.8%	51.7%	23.6%
Race/Ethnicity			
Asian	15.4%	52.1%	32.4%
Hispanic	36.1	45.2	18.6
Black	32.3	48.8	18.9
White	21.9	53.3	24.8
American Indian	43.0	44.5	12.5
School Control			
Public	26.5%	50.7%	22.9%
Catholic	6.3	70.8	22.9
Independent (NAIS)	4.9	32.0	63.1
Other private	12.6	55.4	32.0
Socioeconomic Status			
Lowest quartile	42.9%	41.9%	15.2%
Second quartile	30.0	51.2	18.8
Third quartile	19.1	57.1	23.8
Highest quartile	9.2	55.5	35.4
Gender			
Male	26.6%	49.4%	24.0%
Female	22.9	53.9	23.1
College Expectations			
No college	52.0%	38.8%	9.2%
Some college, won't graduate	33.6	50.9	15.5
Graduate, graduate plus	11.7	56.9	31.4

[a]All students not qualifying for the middle or advanced groups were categorized as "low." For further detail, see Appendix B.

[b]The middle group comprised those sophomores who did not qualify for the advanced group but who reported taking one year or more of algebra I or geometry.

[c]All sophomores who reported having taken at least one year of coursework (the year could be a cumulative total across the listed courses) in Algebra II, trigonometry, precalculus, and calculus were classified as advanced.

Note: Owing to rounding, rows may not sum to 100 percent.

Source: National Education Longitudinal Study of 1988: First Follow-Up (1990) Student Survey, U.S. Department of Education, National Center for Education Statistics.

within four years of high school graduation" while "only 1 out of every 40 black students who did not take at least one year of high school geometry attained a bachelor's degree or senior status within four years of high school graduation; the comparable figure for Hispanic students is 1 in 60."

Given such findings from NELS:88's predecessor study, we examine below the student-reported enrollment in geometry and in advanced math, with attention to differences found by race/ethnicity, socioeconomic status, gender, and school control type. Subsequently, we examine group differences in reported exposure to certain key instructional practices. Sophomores were classified according to whether they had taken an advanced math sequence (a year of coursework, taken from any combination of Algebra II, trigonometry, precalculus or calculus).

Sophomores who had not taken such an advanced sequence but had taken a year or more of algebra or geometry were put in a middle group. Finally, those sophomores who had not taken a year or more of algebra 1 or of geometry were categorized as belonging to the low math course-taking group. Tables 1.2 (math course level) and 1.3 (geometry) show similar patterns of results, which are summarized below; Figure 1.1 graphs the variation in the proportion of students who have taken advanced math coursework by school control type and by race/ethnicity.

Race/ethnicity, Math Coursework Results

- Asians are significantly more likely than whites to have completed advanced coursework in mathematics (32 percent for Asians versus 25 percent for whites) while whites are more likely than Asians to fall into the low coursework category (15 percent for Asians as opposed to 22 percent for whites).

- On the other hand, whites are significantly more likely to have taken advanced coursework (25 percent) than are Hispanics (19 percent), blacks (19 percent), or American Indians (13 percent).

- Asians are more likely to fall into the advanced group and less likely to fall into the low group than any other minority racial/ethnic category (32 percent of Asians are in the advanced math group, contrasted to 25 percent of whites, 19 percent each for blacks and Hispanics, and 13 percent for American Indians; only 15 percent of Asians are in the low coursework level, contrasted to 36 percent of Hispanics, 32 percent of blacks, 22 percent of whites, and 43 percent of American Indians).

School control

- When public schools are contrasted with Catholic schools, there is no significant difference in math course taking at the advanced level, but public school students are more likely to be in the low coursework level (27 percent for public versus 6 percent for Catholic), and Catholic school students are more likely to fall into the middle level (71 percent of Catholic school students as opposed to 51 percent of public).

- Public school students are more likely to fall into the low math category than those of any of the three other school types (Catholic, NAIS, other private), though at the advanced level, only NAIS students are significantly better represented than public school students.

Table 1.3
Geometry Coursework by Background Characteristics

	AMOUNT	
	Less than 1 year[a]	**1 Year or more[b]**
Total	53.3%	46.7%
Race/Ethnicity		
Asian	40.4%	59.6%
Hispanic	66.6	33.4
Black	62.3	37.7
White	50.2	49.8
American Indian	70.6	29.4
School Control		
Public	55.9%	44.1%
Catholic	25.5	74.5
Independent (NAIS)	15.2	84.8
Other private	43.1	56.9
Socioeconomic Status		
Lowest quartile	72.7%	27.3%
Second quartile	62.3	37.7
Third quartile	50.4	49.6
Highest quartile	31.7	68.3
Gender		
Male	54.4%	45.6%
Female	52.2	47.8
College Expectations		
No college	81.5%	18.5%
Some college, won't graduate	69.5	30.5
Graduate, graduate plus	38.4	61.6

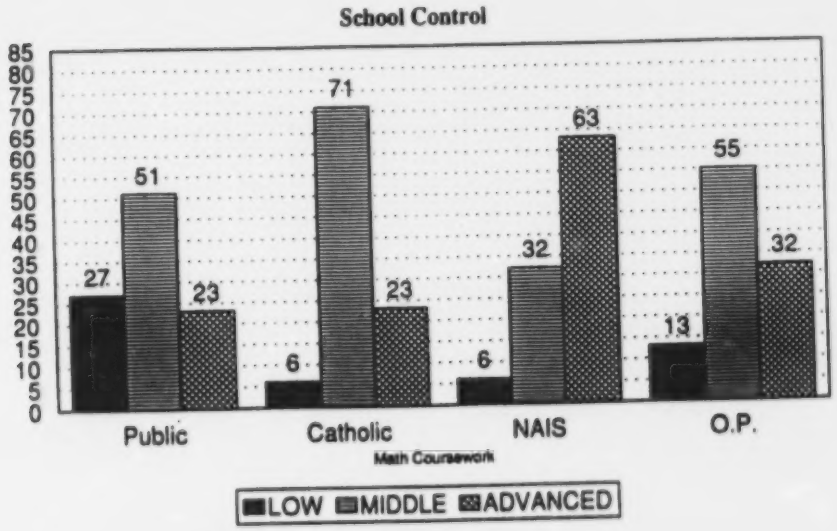
[a]Most students in this category reported that they had taken no geometry (48.2% of all sophomores) though some 1990 sophomores (5.1%) had taken a single semester.

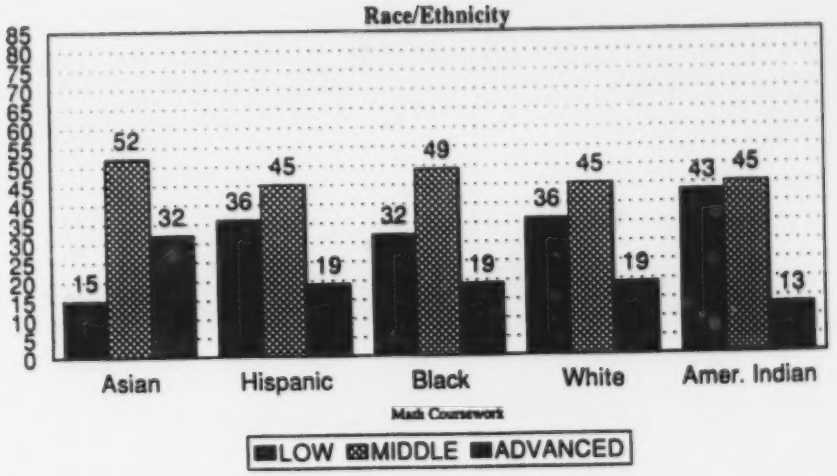
[b]Some 45.3 percent of all sophomores reported that they had taken one year only while 1.4 percent reported that they had taken more than a year of geometry (e.g., a year of plane, plus a semester of solid, geometry).

Note: Owing to rounding, rows may not sum to 100 percent.

Source: National Education Longitudinal Study of 1988: First Follow-Up (1990) Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 1.1: Math Coursework Level By School Control and by Race/Ethnicity





Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

- The likelihood of falling into the advanced math coursework group is significantly higher for NAIS students than for any other school type (63 percent for NAIS versus 23 percent for both public and Catholic and 32 percent for other private).

Socioeconomic status (SES)[15]

- When the lowest and highest quartiles are contrasted, there are significant differences between them across all three categories of coursework. More than four times as many lowest SES quartile tenth graders than their counterparts from the highest SES quartile are found in the lowest math coursework level (43 percent for the lowest SES quartile, 9 percent for the highest).

- On the other hand, high-SES[16] sophomores appear in the high math coursework category at more than double the rate of low-SES sophomores (35 percent versus 15 percent). [17]

Gender

- More males are in the low level math coursework category, and more females are in the middle level.

- The difference between males and females in advanced level coursework is not significant.

College expectations

- Of students who do not expect to go on to college, more than half (52 percent) were in the low math group, that is, those who had not taken a year or more of algebra or geometry. Some 39 percent of those who do not expect to go on to college were in the middle group, and 9 percent were in the advanced math course group.

- For sophomores expecting to graduate from college or to earn a graduate or professional degree, 12 percent were in the low math course-taking group, 57 percent were in the middle, and 31 percent had taken an advanced math sequence, that is, a year or more of some combination of Algebra II, trigonometry, precalculus, or calculus.

- There are significant differences in math course-taking in relation to college expectations in that less advanced math coursework is associated with lack of college expectations and more advanced math coursework is systematically associated with higher college expectations. While this relationship is unsurprising, it is perhaps more noteworthy that 12 percent of those who expect to graduate from college are in the low math group, that is, report that they have not

[15]The NELS:88 socioeconomic status variable takes account of material, cultural or socioenvironmental factors by providing a composite measure of parental education levels, prestige of parental occupations, and family income--see Appendix B for further details.

[16]In this report "high SES" and "highest SES quartile" are used synonymously, as are "low SES" and "lowest SES quartile".

[17]These results parallel those of the NELS:88 base year. Horn and Hafner (1992) found that nearly half of high-SES eighth graders reported attending algebra or advanced math classes, compared with 15 percent of lowest SES quartile eighth graders (and 28 percent of those in the middle two SES categories). Low-SES students were more than twice as likely as high-SES students to be in a remedial mathematics class.

yet taken a year or more of algebra or geometry. Also, fewer than a third (31 percent) of those who expect to obtain a college degree or higher have taken an advanced math sequence.

Geometry Results

Race/ethnicity

- Asian sophomores are more likely than any other group to have completed a year or more of geometry, followed by whites. While 59.6 percent of Asians had completed a year or more of geometry, just under half of whites had done so (49.8 percent) compared to 33.4 percent of Hispanics, 37.7 percent of blacks, and 29.4 percent of American Indians.

- Whites are significantly more likely than Asians to have not completed a year of geometry (50.2 percent have not done so, as contrasted to 40.4 percent of Asians), while Hispanics (66.6 percent), blacks (62.3 percent), and American Indians (70.6 percent), are all significantly more likely to fall into the group without a year of geometry than are whites.

School control type

- Tenth graders in NAIS schools are more likely than tenth graders in public schools to have completed a year of geometry (85 percent for NAIS students, 44 percent for public). Though differences between NAIS and Catholic school students in geometry course taking are not statistically significant, NAIS sophomores are more likely than sophomores in other private schools to have taken a year of geometry (85 percent versus 57 percent).

- Students in public schools are also significantly less likely than students in Catholic schools to have completed a year of geometry by spring of the sophomore year (74.5 percent of Catholic school students have completed a year of geometry, compared to 44.1 percent of public school students).

Socioeconomic status

- High-SES students are far more likely than low-SES students to have completed a year of geometry by the spring of the sophomore year (27 percent for the lowest SES quartile but 68 percent for the highest).

Gender

- Gender differences are *not* significant for geometry course taking. Male sophomores are no more likely than female sophomores to have taken a year or more of geometry.

Postsecondary expectations

- Some 62 percent of sophomores who expect to complete college have taken a year of geometry; about 82 percent of sophomores who do not expect to go on to college have not taken a year of geometry. Given the finding by Pelavin and Kane (1990) from the HS&B data that completing a year of geometry greatly increases the odds that a student will go on to, as

well as persist in, college,[18] the fact that 70 percent of those who expect to get some college education but not graduate and 38 percent of those who expect to complete a 4-year degree or go beyond it had not completed a year of geometry by the spring of their sophomore year, is noteworthy. While these students still have 2-years of high school in which to complete additional mathematics courses, a substantial portion of sophomores with college expectations lags behind their peers in mathematics course taking.

There is some evidence, then, that different demographic subpopulations participate differentially in the mathematics curriculum. In particular, there are gaps between Asian and white sophomores on the one hand, and other (non-Asian) minorities on the other; between high- and low-SES groups; and between tenth graders in independent and in public schools. Asians, whites, high-SES, and independent school sophomores are all more likely to have taken a year of geometry and to have taken an advanced math sequence of courses by the spring of sophomore year. However, there was no significant difference between males and females in the likelihood of having taken a year or more of geometry by the spring term of the sophomore year, just as there were no gender differences in the likelihood of having taken an advanced math sequence overall.

1.2 INSTRUCTIONAL PRACTICES

In this section we examine instructional practices at three levels. First we explore, from the perspective of emerging curricular and instructional standards, the resources and activities that are employed in tenth-grade mathematics classrooms. Second we investigate whether there are subgroup differences in exposure to different instructional practices. Third we describe sophomores' perceptions of the objectives their teachers emphasize in the classroom.

1.2.1 What resources and activities are employed in the tenth-grade mathematics classroom?

Because classroom practices are manipulable--that is, the classroom strategies and behaviors of teachers can be changed and their resources altered or augmented--there has been keen interest in whether instruction can be improved so that students would learn more effectively. In mathematics, as noted earlier in this report, there have been major recent initiatives by the National Council of Teachers of Mathematics (NCTM) (1989, 1991) designed to identify and encourage desirable changes in instructional practices for school mathematics.

The NCTM standards (1989, 1991) emphasize problem solving as well as learning to reason and communicate mathematically. They are designed to encourage teachers to help students *actively* assimilate mathematical knowledge and experiences and construct their own meanings. A major goal of the recommended mathematics curriculum is to establish vividly for all students the connections between school mathematics and real-world applications of the discipline and to instill the power of mathematical reasoning and communication in all learners. In terms of instructional practices in high school mathematics, the standards imply decreased attention to some kinds of practices and increased attention to others[19], as summarized below.

[18]Pelavin and Kane (1990) report that only one student in 20 who had less than a year of geometry had attained the baccalaureate or college senior status within four years of high school graduation, when HS&B 1982 seniors were re-surveyed in 1986.

[19]A more complete summary of recommended changes in instructional practices may be found in the NCTM Professional Standards (NCTM, 1989), p. 129.

Decreased Attention

- teacher and text as sources of knowledge
- rote memorization of facts and procedures
- instruction by teacher exposition
- paper-and-pencil manipulative skill work

Increased Attention

- problem solving as means and goal of instruction
- active involvement of students in mathematical thinking and its application
- promotion of student interaction, (for example, through questioning)
- use of calculators and computers as tools for learning and doing math
- written and oral student communication of mathematical ideas

To be sure, if these emphases and practices were already widespread, there would be little point to encouraging them as reforms. However, it is of interest to establish a baseline that measures the degree to which these recommended changes in instructional emphasis depart from reality in the contemporary classroom, particularly since it seems likely the standards indeed will be implemented on a wide scale.[20] And it will be of further interest to measure progress toward these new standards over coming years, as well as their effect on the mathematics achievement of American students. Table 1.4 depicts the reported frequency of selected practices and uses of resources in the mathematics classrooms of America's 1990 sophomores.

[20]By 1992, 42 states had incorporated the standards into their curriculum guidelines for school districts and schools (CCSSO, 1992).

Table 1.4
Student Reports of Math Class Activities and Resources

In your most recent or current MATH class, how often do/did you:

	Never	Sometimes	Often
Activities			
Review the work from the previous day?	7.7%	33.3%	59.1%
Copy the teacher's notes from the blackboard?	18.1	34.2	47.7
Do story problems or problem-solving?	18.3	51.4	30.4
Participate in student-led discussion?	40.8	39.6	19.6
Explain your work to the class orally?	39.0	37.1	23.9
Resources			
Use books other than textbooks?	70.4%	18.2%	11.3%
Use computers in math class?	84.2	12.6	3.2
Use hands-on materials or models?	68.8	25.2	5.9
Use calculators?	28.3	37.5	34.2

NOTE: Owing to rounding, rows may not sum to 100 percent. Because they are based on sophomores only, percents reported above may differ from weighted percents presented in the codebook to the first follow-up student component data file user's manual.

Source: National Education Longitudinal Study of 1988: First Follow-Up (1990) Student Survey, U.S. Department of Education, National Center for Education Statistics.

The general picture reported by sophomores is that current practices are very far from those recommended by NCTM. This generalization holds true whether we look at classroom activities or resources.

Activities. While the new mathematics instructional standards emphasize problem solving and real-life contextualization of math problems, only 30 percent of sophomores engage in problem-solving activities "often" --though more than 80 percent do so at least sometimes. While the new standards emphasize student discussion and oral explanation, substantial numbers of students report no exposure to such activities in their classrooms (approximately 41 percent report they never participate in student-led discussions in math class, while 39 percent of sophomores report that they never explain their work to the class orally).

Resources. NELS:88 data suggest that American high schools have a good way to go before approaching or meeting the standards for access to and use of mathematical resources. While the NCTM standards recommend the use of books other than math text books, seventy percent of American sopho-

mores report that they never use books other than texts. Nor do most students report using hands-on materials or models.

A major emphasis of the standards is on use of computers and calculators.[21] Nevertheless, 84 percent of sophomores report never using computers, and only 3 percent report frequent use. Even in the case of the ubiquitous, easy-to-use, and relatively inexpensive calculator, over a quarter of the nation's sophomores report that they *never* use calculators in their math class. Nevertheless, just over a third report that they use calculators in class frequently, while another 38 percent use calculators sometimes, with the result that nearly 72 percent of the nation's sophomores reportedly do make at least some use of calculators in their mathematics classrooms.

Because the learning experiences (and opportunities) of the nation's sophomores can differ significantly by school or classroom, it is of interest to investigate whether differences are equitably distributed. Equitable distribution of experiences and opportunities is investigated in the next section.

1.2.2 Are there group differences in exposure to particular classroom practices?

In coming years it will be important to monitor the degree to which the new math standards are becoming widespread. But it will be no less important to determine just who is being exposed to the recommended instructional methods and curriculum, in order to ensure that all groups in American society benefit equally. Given that the standards had had little time to have an impact at the time of the NELS:88 first follow-up, 1990 data provide an excellent baseline for future investigation of this question. We have therefore selected four measures reflecting student reports of activities recommended in the NCTM standards--use in the math classroom of books other than math texts, use of hands-on material, frequency of being asked to explain math work to the class orally, and use of calculators--to compare the experience of different racial, gender, and SES groups, as well as to compare the experience of sophomores in public and various kinds of private schools. Student reports suggest that the first two of these activities -- using a text other than a math text in the math classroom, and using hands-on material in math -- were not widespread in 1990 high schools. The latter two activities, however -- explaining one's work orally to the math class, and use of calculators in math class -- appear to have been applied more widely.

Use Books Other than Math Text (Table 1.5). There are few notable differences among groups on this item (See Table 1.5.) Overall, only 11 percent of sophomores *often* use books other than a math text for their math course. Whites are significantly less likely to use a nonmath book often than are blacks or Hispanics (10 percent for whites, 15 percent both for blacks and Hispanics), and public school students are more likely to often use another book than are Catholic school students (11 percent versus 7 percent). Students in the lowest SES quartile are twice as likely as students in the highest SES quartile to often use books other than a math text (16 percent versus 8 percent).

Use Hands-On Material (Table 1.6). Use of hands-on material is not widespread (69 percent report *never* using hands-on material and only 6 percent *often* do) nor are there striking differences

[21]The NELS:88 1990 student questionnaire did not distinguish between conventional calculators (which perform arithmetic functions), and graphing calculators; the latter perform many of the same functions as the microcomputer in that they produce graphical displays of mathematical relationships. The graphing calculator may therefore also perform some of the same pedagogic functions in math as the computer. Insofar as this is true, a strong contrast need not necessarily be drawn between calculators and computers, though it becomes increasingly important to inquire into what kind of calculators are being used in math classrooms. For more information on the technology and pedagogy of the graphical representation of quantitative relationships, see Romberg, Fennema and Carpenter, eds., 1993.

between groups. Whites (71 percent) are more likely to report never using hands-on material than are Hispanics (66 percent) and blacks (62 percent). None of the differences between school control types are statistically significant, nor are gender differences significant. However, sophomores in the lowest SES quartile are a bit more likely to use hands-on material *often* than are students in the highest SES quartile (7.5 percent versus 4.4 percent).

Table 1.5

Use Books Other Than Math Text by Background Characteristics

	Never	Sometimes	Often
Total	71.1%	18.0%	10.9%
Race/Ethnicity			
Asian	65.5%	22.2%	12.3%
Hispanic	63.2	22.0	14.8
Black	61.5	23.9	14.6
White	74.6	15.9	9.5
American Indian	47.9	29.7	22.4
School Control			
Public	71.0%	17.9%	11.1%
Catholic	73.8	18.8	7.4
Independent (NAIS)	63.6	25.6	7.9
Other private	76.9	12.3	10.8
Socioeconomic Status			
Lowest quartile	61.1%	23.3%	15.6%
Second quartile	69.3	18.8	11.9
Third quartile	75.1	15.6	9.3
Highest quartile	77.9	14.5	7.6
Gender			
Male	69.8%	18.6%	11.5%
Female	72.4	17.3	10.3

Note: Owing to rounding, rows may not sum to 100 percent.

Note: Owing to differences in the number of missing cases in this analysis of math class activities and resources and the analysis of math class activities and resources reported in Table 1.4, percentages for the same dimension may differ slightly.

Source: National Education Longitudinal Study of 1988: First Follow-Up (1990) Student Survey, U.S. Department of Education, National Center for Education Statistics.

Explain Your Work to the Class Orally (Table 1.7). There are several statistically significant differences among groups on this item. In terms of race/ethnicity, whites are significantly less likely to be asked *often* to explain work orally in class than blacks (23 percent of whites report being often asked to explain their math work orally, as compared to 34 percent of blacks. Asians also are significantly less likely than blacks to *often* be asked to explain their math work in class. When viewed by school control, there are several significant differences in the "*never*" category. Public school sophomores are more likely than independent school sophomores to *never* be asked to explain their work orally (40 percent versus 19 percent. Tenth graders in other private schools are also more likely than independent school tenth graders to *never* be asked to explain their math work orally (39 percent versus 19 percent. While the differences among SES groups in the "*often*" category are not significant, lowest SES quartile students are significantly more likely to *never* be asked to explain work orally than are highest SES quartile students (43 percent versus 34 percent, or to be asked only *sometimes* (for highest quartile, 42 percent are *sometimes* asked, for the lowest quartile, 33 percent). A slightly greater proportion of females than males falls into the "*often*" category for this item (25 percent of females are often asked to explain math work to the class orally, versus 23 percent of males. (Unfortunately, we do not have trend data that would establish whether this small but statistically significant difference reflects greater teacher efforts over the last several years to interact with and encourage the participation of female students in math classes.)

Use Calculators in Math Class (Table 1.8). Some notable group differences are apparent for use of calculators; these differences raise equity issues. Although differences between whites and Asians are not significant, whites are more likely than Hispanic, black, or American Indian sophomores to use calculators in math class *often* (38 percent for whites, 30 percent for Hispanics, 23 percent for blacks, and 21 percent for American Indians). Asians are also significantly more likely than blacks to use calculators *often* in their tenth-grade math classrooms--35 percent of Asians use calculators often in math, as contrasted to 23 percent of blacks. NAIS sophomores are more likely than public school sophomores to use calculators in math class often (58 percent for NAIS, 35 percent for public). There are also SES differences in calculator use. Over 40 percent of highest SES quartile students use calculators in math class often, compared to 30 percent of those in the lowest SES quartile. Some 23 percent of highest SES quartile tenth graders never use calculators in math class, while 33 percent of lowest quartile students never do. While more males than females "sometimes" use calculators in class, gender differences for the "never" and "often" categories are not statistically significant.

Of the four recommended classroom practices examined here, only "explain your work orally" and "use calculators" receive rankings of "sometimes" or "often" by half or more of 1990 sophomores. For both the practices that are widespread, high-SES students enjoy some advantage over low-SES students. High-SES tenth graders also are somewhat less likely than low-SES tenth graders to fall into the "never asked" category in terms of oral explanation in math class. Differences favoring high-SES sophomores are not apparent for the two practices that are less widespread--use of hands-on material and non-math texts in the mathematics classroom. A major question for coming years is whether these patterns will change over time as the NCTM standards become more widely implemented.

Table 1.6
Use Hands-On Material, by Background Characteristics

	Frequency		
	Never	Sometimes	Often
Total	68.8%	25.4%	5.8%
Race/Ethnicity			
Asian	65.5%	30.7%	6.8%
Hispanic	66.1	27.6	6.3
Black	61.9	26.8	11.3
White	70.7	24.6	4.7
American Indian	65.9	25.3	8.8
School Control			
Public	69.0%	25.3%	5.7%
Catholic	63.6	30.0	6.4
Independent (NAIS)	69.1	24.0	6.9
Other private	78.9	18.3	3.2
Socioeconomic Status			
Lowest quartile	65.3%	27.1%	7.5%
Second quartile	69.2	24.9	6.0
Third quartile	70.6	23.9	5.5
Highest quartile	69.5	26.1	4.4
Gender			
Male	69.4%	25.2%	5.4%
Female	68.2	25.6	6.2

Note: Owing to rounding, rows may not sum to 100 percent.

Note: Owing to differences in the number of missing cases in this analysis of math class activities and resources and the analysis of math class activities and resources reported in Table 1.4, percentages for the same dimension differ slightly.

Source: National Education Longitudinal Study of 1988: First Follow-Up (1990) Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 1.7
Explain Your Work to the Class Orally, by Background Characteristics

	Frequency		
	Never	Sometime	Often
Total	39.1%	37.0%	23.9%
Race/Ethnicity			
Asian	40.7%	41.7%	17.7%
Hispanic	46.2	35.0	18.9
Black	31.5	34.4	34.1
White	39.4	37.3	23.4
American Indian	39.3	44.7	16.0
School Control			
Public	40.0%	36.2%	23.8%
Catholic	31.0	42.1	26.9
Independent (NAIS)	18.8	52.2	29.0
Other private	39.0	44.3	16.7
Socioeconomic Status			
Lowest quartile	42.8%	32.8%	24.4%
Second quartile	40.0	36.2	23.8
Third quartile	40.4	36.4	23.2
Highest quartile	34.3	41.8	23.9
Gender			
Male	40.1%	37.1%	22.8%
Female	38.1	36.9	25.1

Note: Owing to rounding, rows may not sum to 100 percent.

Note: Owing to differences in the number of missing cases in this analysis of math class activities and resources and the analysis of math class activities and resources reported in Table 1.4, percentages for the same dimension differ slightly.

Source: National Education Longitudinal Study of 1988: First Follow-Up (1990) Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 1.8
Use Calculators, by Background Characteristics

	Frequency		
	Never	Sometime	Often
Total	27.8%	37.5%	34.7%
Race/Ethnicity			
Asian	28.5%	36.1%	35.4%
Hispanic	32.6	37.1	30.3
Black	35.7	41.1	23.3
White	25.6	36.9	37.6
American Indian	35.7	43.7	20.7
School Control			
Public	27.6%	37.6%	34.7%
Catholic	30.0	41.0	29.0
Independent (NAIS)	21.2	21.1	57.7
Other private	31.3	31.3	37.4
Socioeconomic Status			
Lowest quartile	33.2%	36.7%	30.1%
Second quartile	28.7	37.8	33.5
Third quartile	26.3	38.4	35.3
Highest quartile	23.2	36.5	40.3
Gender			
Male	27.5%	39.0%	33.4%
Female	28.0	36.0	36.0

Note: Owing to rounding, rows may not sum to 100 percent.

Note: Owing to differences in the number of missing cases in this analysis of math class activities and resources and the analysis of math class activities and resources reported in Table 1.4, percentages for the same dimension differ slightly.

Source: National Education Longitudinal Study of 1988: First Follow-Up (1990) Student Survey, U.S. Department of Education, National Center for Education Statistics.

1.2.3 In the sophomore's view what objectives do teachers stress in the classroom?

The NCTM standards suggest that certain objectives should be more strongly emphasized than others. While memorizing math facts and procedures is important, the standards suggest that at present memorization may be overemphasized relative to such other important goals as problem solving. Additionally, the standards specify that greater emphasis should be given to showing the way that math connects with the problems of everyday life.

Table 1.9 summarizes sophomores' reports on what teachers emphasize in their mathematics classrooms. It is important to note that these are student perceptions of what the teacher is stressing and may or may not agree with the teacher's notion of what is being emphasized.[22]

Table 1.9

Degree of Emphasis Accorded Various Mathematics Classroom Objectives

In your most recent or current mathematics class, how much emphasis does/did the teacher place on the following objectives?

	None	Minor Emphasis	Moderate Emphasis	Major Emphasis
Increasing your interest in math	14.9%	27.8%	34.5%	22.8%
Learning/memorizing math facts, rules, and steps	4.2	12.8	30.1	52.9
Preparing you for further study in math	7.1	15.9	33.8	43.2
Thinking about what a problem means and the ways it might be solved	5.0	11.9	30.9	52.2
Showing you the importance of math in daily life	13.9	26.6	29.7	29.8

Source: National Education Longitudinal Study of 1988: First Follow-Up (1990) Student Survey, U.S. Department of Education, National Center for Education Statistics.

Interestingly, students seemingly perceive both memorization of facts and procedures and problem solving as comparatively strongly emphasized aspects of their instructional programs. Over half of sophomores agreed that these two objectives received major emphases; only around 17 percent felt that these two objectives received no or minor emphasis. Students' perceptions that mathematical problem

[22]Teacher reports on what is emphasized in the classroom may differ from student reports because teachers have a more sophisticated understanding of their classroom goals, because of social desirability biases on what teachers feel they should be teaching, or for any of a number of other reasons. In the NELS:88 teacher questionnaire, mathematics teachers were asked how they use various teaching methods and how much emphasis they give various objectives. While neither eighth (1988) nor tenth (1990) grade teacher data are reported here, analyses of NELS:88 teacher data on eighth graders' instruction in mathematics appear in Horn & Hafner, 1992.

solving receives major emphasis in class is perhaps noteworthy given the fact that National assessments (and international comparisons) report this area as a weakness of American students.[23]

While, in the view of students, their teachers are stressing problem solving in the classroom, fewer than a third of sophomores thought that teachers placed major emphasis on showing them the importance of math in daily life, and around 40 percent felt that this objective received little or no emphasis.

In the section that follows--which examines mathematics achievement--we will return to some of the factors discussed in this section, such as emphasis on factual and procedural memorization, emphasis on problem solving, reviewing the work from the previous day--to see whether differences in mathematics achievement are associated with these practices and emphases.

1.3 TESTED ACHIEVEMENT

The third area of interest that we identified for investigation was the relationship between tested mathematics achievement and selected student background, curricular and instructional factors. These relationships are depicted in the two tables (Tables 1.10 and 1.11) below.

Curricular and instructional factors, as we have noted, are alterable, and change in curriculum and instruction has been an imperative of the recent school reform movement. The reader is cautioned that an association between some such factor and achievement does not establish a cause-and-effect relationship, though it may suggest topics for further investigation, using more sophisticated analytic techniques that take account of the many interacting factors that may influence test results.

Background characteristics are important to examine too, both for a better understanding of group differences in achievement and because equity considerations argue for efforts to overcome achievement gaps between groups. While the trend is toward some narrowing of group differences, historically, black and Hispanic students have been less well served by the education system in terms of mathematics learning than have white and Asian students. Important disparities between males and females in mathematics achievement have been observed late in high school and thereafter.

The first table--Table 1.10--presents tested mathematics achievement in terms of mastery or proficiency levels. The second table (Table 1.11) presents mathematics achievement in terms of the mathematics test quartile, which arrays scores from highest to lowest in four equal gradations.

NELS:88 test scores can be reported in various forms, each of which may be useful for a different purpose. Because proficiency scores are available only for mathematics and reading, most tables in this report present test quartiles. Nevertheless, because proficiency scores give additional information--they represent a specifiable level of mastery of mathematics materials--we briefly summarize results (in Table 1.10 below) by proficiency level, before examining (in Table 1.11) in more detail mathematics achievement on a quartile basis.

Proficiency score reports assume that skills in mathematics follow a building-block pattern. That is, the skills required to master the basic level are assumed to be necessary to achieve proficiency at the next higher level, and so on until the highest level is reached. The four mastery levels of mathematics proficiency may be defined as follows.

[23]See, for example, Mullis, Owen, and Phillips, 1990.

- **Math Level 1**--Simple arithmetical operations on whole numbers
- **Math Level 2**--Simple operations with decimals, fractions, and roots
- **Math Level 3**--Simple problem solving requiring conceptual understanding or the development of a solution strategy
- **Math Level 4**--Conceptual understanding and complex problem solving

Table 1.10
Mathematics Proficiency Results, by Background Characteristics, Program, Homework

	Below Level 1	Level 1	Level 2	Level 3	Level 4
Total	11.2%	26.5%	14.8%	25.1%	22.4%
Sex					
Male	12.0%	24.6%	15.0%	23.8%	24.6%
Female	10.4	28.5	14.6	26.4	20.1
Race/Ethnicity					
Asian	6.6%	18.7%	8.9%	34.8%	31.0%
Hispanic	15.7	39.8	15.7	16.6	12.1
Black	20.2	42.8	16.6	14.6	5.8
White	9.1	22.1	14.7	27.7	26.5
American Indian	20.6	46.5	13.2	16.2	3.5
Socioeconomic Status					
Lowest quartile	18.1%	43.3%	16.4%	15.1%	7.1%
Second quartile	13.3	30.4	17.0	24.2	15.1
Third quartile	9.9	23.1	16.5	28.7	21.8
Highest quartile	4.4	12.8	10.2	30.7	41.9
School Control					
Public	11.9%	27.6%	14.8%	24.6%	21.1%
Catholic	3.7	20.0	15.7	29.3	31.3
Independent (NAIS)	5.8	1.1	10.3	18.2	64.6
Other private	5.0	17.7	12.1	37.7	27.6
High School Program					
General	11.4	28.6	16.9	25.2	18.0
Academic	4.2	14.0	12.4	31.4	37.9
Vocational/Technical	21.1	44.2	13.4	15.2	6.0
Other or Don't Know	19.8	40.0	15.7	16.0	8.5
Hours of Homework Per Week					
None	45.5	36.0	7.2	8.1	3.2
Up to 2 hours	18.9	35.6	14.2	18.0	13.4
2 to 5 hours	11.6	30.1	16.8	23.7	17.7
More than 5 hours	6.7	20.4	14.1	29.3	29.4

KEY: **Math Level 1**–Simple arithmetical operations on whole numbers
Math Level 2–Simple operations with decimals, fractions, and roots
Math Level 3–Simple problem solving requiring conceptual understanding or the development of a solution strategy
Math Level 4–Conceptual understanding and complex problem solving

Note: Owing to rounding, rows may not sum to 100 percent.

Source: National Education Longitudinal Study of 1988: First Follow-Up (1990) Student Survey, U.S. Department of Education, National Center for Education Statistics.

The proficiency score results for spring term 1990 sophomores show that:

Overall

- Just over 11 percent of sophomores were unable to perform simple arithmetic operations on whole numbers (that is, failed to display mastery at proficiency level 1).
- Over one-fourth were able to perform simple arithmetical operations on whole numbers, but not (Math Level 2) simple operations with decimals, fractions, and roots.
- A further 15 percent were able to demonstrate level 1 and 2 skills, but could not perform simple problem solving that requires conceptual understanding.
- About a quarter of spring term 1990 American sophomores had mastered simple problem solving but not (Level 4) complex problem solving.
- Finally, just over 22 percent of sophomores showed the highest level of mathematics mastery, that is, conceptual understanding and complex problem solving.

Race/Ethnicity

- Whites and Asians were more likely than black and Hispanic students to have achieved proficiency in problem-solving mathematics skills (some 31 percent of Asians and 26.5 percent of whites were at level 4, compared to 12 percent of Hispanics and 6 percent of blacks).

Socioeconomic Status

- Low SES sophomores were 4.1 times more likely to lack basic skills than were high SES quartile sophomores. At the other end of the scale, highest SES quartile students were six times more likely than lowest SES quartile students to display mastery of high-level mathematical skills. Indeed, 42 percent of students in the highest SES quartile achieved mastery of the high-level mathematics skills in problem solving, as contrasted to only 7 percent of the lowest SES quartile students;
- Only 4 percent of the highest SES sophomores, but over 18 percent of the lowest quartile sophomores, lacked basic skills.

Gender

- Males were more likely than females (25 percent versus 20 percent) to have mastered complex problem-solving skills; otherwise, gender differences in sophomore mathematics achievement were not statistically significant.

High School Program

- Sophomores who reported themselves to be in the academic track were more than six times more likely to score in the highest math proficiency level than were vocational track sophomores (38 percent versus 6 percent).

- Over a fifth of sophomores who reported themselves to be in the vocational track failed to show mastery of simple arithmetic operations on whole numbers (that is, were below Level 1).

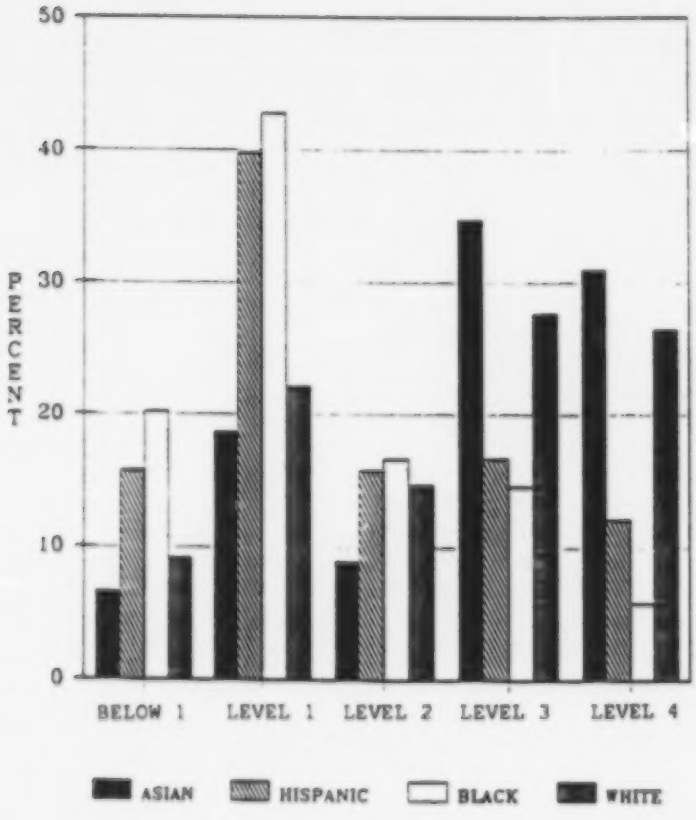
- Sophomores in the academic track were more than twice as likely (38 percent versus 18 percent) to demonstrate mastery of the highest math proficiency level than those in general high school program.

Homework

- Sophomores who reported doing more than five hours of homework per week were more than twice as likely to display proficiency at the highest math level than were sophomores who report doing some but not more than two hours of homework per week (29 percent versus 13 percent).

Figure 1.2--Mathematics achievement by race/ethnicity

Percent of 1990 sophomores at each proficiency level



Level 1 = Simple arithmetical operations with whole numbers
Level 2 = Simple operations with decimals, fractions and roots
Level 3 = Simple problem solving
Level 4 = Conceptual understanding and complex problem solving

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 1.11 presents math test quartile results by background characteristics, opportunity to learn, and instructional factors.

Table 1.11
Math Test Quartile, by Background Characteristics, Opportunity to Learn, Homework, and Instructional Factors

	Test Quartile			
Background Characteristics	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile
Race/Ethnicity				
Asian	13.8%	20.4%	26.9%	39.0%
Hispanic	34.6	32.5	20.2	12.7
Black	41.8	31.6	18.2	8.4
White	16.8	23.5	28.1	31.6
American Indian	51.8	24.6	16.7	6.9
School Control				
Public	23.3%	25.8%	25.3%	25.7%
Catholic	10.2	21.0	34.0	34.8
Independent (NAIS)	5.3	10.0	13.5	71.2
Other private	9.8	22.4	36.8	31.0
Socioeconomic Status				
Lowest quartile	40.1%	31.3%	19.8%	8.8%
Second quartile	24.7	29.8	25.4	20.0
Third quartile	17.1	26.8	29.1	27.0
Highest quartile	8.3	15.1	28.5	48.1
Gender				
Male	22.2%	24.5%	24.8%	28.6%
Female	21.9	25.9	27.1	25.2
Opportunity to Learn: Math Coursework Level				
Low	55.0%	32.7%	9.5%	2.8%
Middle	12.9	27.7	34.9	24.5
Advanced	8.0	12.6	23.3	56.1

Notes: 3.1 percent are not taking sophomore math in any form. Owing to rounding, rows may not sum to 100 percent.

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up (1990) Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 1.11
Math Test Quartile by background characteristics, opportunity to learn, and instructional factors--continued.

	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile
Perceived Instructional and Curricular Emphasis:				
Math Facts/Rules Emphasis:				
None	43.3%	30.2%	18.1%	8.4%
Minor emphasis	31.6	28.5	22.6	17.4
Moderate emphasis	24.1	25.8	25.4	24.8
Major emphasis	15.0	23.6	28.5	33.0
Math Problem-Solving Emphasis				
None	36.1%	28.4%	22.6%	12.9%
Minor emphasis	30.4	26.4	23.9	19.4
Moderate emphasis	21.5	25.9	25.7	26.9
Major emphasis	17.1	24.0	27.8	31.1
Learning Practices:				
Review Math From Previous Day				
Never	33.3%	25.1%	24.2%	17.5%
Sometimes	27.4	26.2	23.5	22.9
Often	16.1	24.5	28.2	31.2
Mathematics Homework:				
Less than 2 hours/week	23.0%	26.8%	26.3%	24.0%
Two hours or more/week	15.1	21.0	27.4	36.5

Notes: 3.1 percent are not taking sophomore math in any form. Owing to rounding, rows may not sum to 100 percent.

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up (1990) Student Survey, U.S. Department of Education, National Center for Education Statistics.

A number of comparisons of interest may be drawn from this table. Some of the most important comparisons are summarized below:

Race/Ethnicity

- Asians, followed by whites, show consistently higher mathematics achievement than do Hispanics or blacks. Thus, for example, 39 percent of Asians and 32 percent of whites score in the highest test quartile, as compared to 13 percent of Hispanics and 8 percent of blacks. Likewise, 42 percent of black and 35 percent of Hispanic sophomores scored in the lowest mathematics test quartile, compared to 14 percent of Asians and 17 percent of whites.

School Control

- Independent schools show strikingly better mathematics test results than any of the other three school types, with more than twice the proportion of sophomores in the top math quartile than Catholic, public, or other private schools. More specifically, some 71.2 percent of independent school sophomores scored in the highest mathematics test quartile, as compared to 35 percent of Catholic school sophomores, 31 percent of tenth graders from other private schools, and 26 percent of sophomores in public schools.

Socioeconomic Status

- Socioeconomic status was a strong predictor of mathematics test results. Over four times more low-SES tenth graders than high-SES tenth graders are in the bottom quartile while five times more high SES-students than low-SES students are in the highest test quartile. Forty percent of low SES quartile sophomores scored in the lowest mathematics quartile, compared to 8 percent of the high SES sophomores. While 48 percent of the high-SES sophomores scored in the highest mathematics quartile, only 9 percent of the low-SES sophomores achieved such a score. [High SES v. Low (low quartile), (high quartile)].

Gender

- As in the NELS:88 base year, gender differences in mathematics achievement were comparatively small. Except for the modest male advantage in the highest math quartile, differences by quartile were not statistically significant.[24]

[24]Other NELS:88 findings on mathematics achievement in relation to gender should be noted. When male and female mean math test scores are compared, there are no significant gender differences in overall mathematics scores, although when test scores are viewed in terms of proficiency levels, a slightly higher proportion of tenth-grade males than females had mastered complex problem-solving skills (Rock and Pollack, 1993). Longitudinal analysis of 1988 eighth graders 2 years later shows that there were no significant differences among males and females with respect to overall gains from 1988 to 1990 in mathematics, nor were there differences in the proficiency levels at which gains were found (Scott, Rock, Pollack and Ingels, 1994; however, for some qualifications to this generalization see Rock, Owings and Lee, 1994). The close similarity of male and female results for NELS:88 sophomores is consistent with the results for NELS:88 eighth graders 2 years before, which showed no difference in math performance between boys and girls (Rock, Pollack and Hafner, 1991; for some additional perspectives on the base year mathematics results by gender, see Snow and Ennis, 1994). Given that there is more opportunity for differential course taking in eleventh and twelfth grades, it will be of interest to see whether boys will take more advanced math and whether male-female differences in math achievement will appear by senior year—as HS&B and NAEP data suggest has historically been the case.

Math coursework

- Achievement in mathematics is associated with enrollment in more advanced courses. Over half (55 percent) of those who have taken only low-level math courses score in the lowest test quartile; just under 3 percent of this group scored in the highest math test quartile. On the other hand, over half (56 percent) of the advanced math group scored in the highest math quartile, with only 8 percent of the advanced math group scoring in the lowest math test quartile.

Math homework

- Sophomores who spend two or more hours per week on math homework are significantly more likely to score in the highest math test quartile than sophomores who do less math homework (36.5 percent versus 24.0 percent). On the other hand, sophomores who report completing fewer than two hours of math homework weekly are more likely to fall into the bottom two math quartiles than sophomores who spend more time on math homework (23 percent of students who do less than two weekly hours of math homework fall in the bottom math test quartile, as contrasted to 15 percent of those who complete two or more; 27 percent of the "less than 2 hours homework" group fall into the second lowest quartile, versus 21 percent of the 2 or more hours homework group.

Perceived Instructional Emphasis

- For the math-facts-and-rules emphasis, 33 percent of sophomores who thought their teachers accorded this objective major emphasis scored in the highest math quartile, as contrasted to only 8.4 percent of those who felt this objective was not emphasized at all and 17.4 percent of those who felt this objective was only a minor emphasis of their math teacher.

  In terms of emphasis on problem solving, 31 percent of sophomores who thought their teachers accorded this objective major emphasis scored in the highest math quartile, as contrasted to 13 percent of those who felt this objective was not emphasized at all and 19 percent of those who felt this objective was only a minor emphasis of their math teacher.

  Although instructional emphasis on facts and rules and instructional emphasis on problem solving are sometimes viewed as alternative rather than complementary strategies, mathematics test results show similar patterns for both emphases. That basic pattern is that for either factual or problem solving emphases, students were more likely to score in the highest quartile if they perceived the objective as a major emphasis of the teacher. Tabular analyses cannot by themselves explain such a pattern; nor did the NELS:88 questionnaire require students to rank one instructional emphasis relative to another. Perhaps this pattern of relationship reflects the simple fact that students who are sensitively attuned to what the teacher is stressing--regardless of what the teacher's emphasis might be--are more likely to be good learners than those who are less aware of what is being emphasized in the classroom. Or, possibly, high-achieving students are more likely to recognize the importance of learning both facts/procedures, and problem-solving strategies.

Learning Practices: Review

- Sophomores who often reviewed their work from the previous day were least likely to fall into the lowest quartile and most likely to fall into the highest quartile in mathematics achievement. Students who never reviewed their work were most likely to fall into the lowest quartile and least likely to score in the highest quartile in mathematics achievement.

  More specifically, as shown in Table 1.11, 31 percent of the sophomores who often reviewed their math work from the previous day scored in the highest math achievement quartile, with just 16 percent falling into the lowest. In contrast 18 percent of sophomores who never review their work from the previous day scored in the highest quartile, while fully a third (33.3 percent) scored in the lowest quartile.

Readers are reminded that this report is a descriptive summary, intended to report national estimates of 1990 sophomores, categorized by their background characteristics, in relation to their educational experience and achievement. Although the NELS:88 dataset provides a basis for rich, interpretive multivariate analyses, such analyses are beyond the scope of this report. It is also useful to remember that most of the descriptive contrasts that we have drawn have examined an educational outcome or process in terms of only one other variable at a time. For example, we examined tested mathematics achievement in relation to the type of school that a sophomore attended. Since many variables are related to achievement, a somewhat different picture emerges as more variables are simultaneously taken into account. This can be illustrated by returning to our findings on the relationship between math quartile and school control type of 1990 sophomores, and introducing an additional factor, socioeconomic status. For simplicity's sake, we shall confine our attention to sophomores from the highest SES quartile who score in the highest math test quartile by the kind of school they attended in 1990. Overall, around a quarter of public school students score in the top math quartile while 71 percent of NAIS students do so. In Table 1.11 above, we saw the following[25]:

School Control	Highest Math Quartile
Public	25.7
Catholic	34.8
Independent (NAIS)	71.2
Other Private	31.0

However, when we consider the performance **only of students in the highest SES quartile**, the contrast by school is as follows:

[25] Before controlling for SES, a comparison of public school students in the highest math quartile to Catholic and NAIS school students in the highest math quartile revealed significant differences among the groups, whereas the percentages of public school students scoring in the highest math quartile were found to not differ significantly from the percentages of "other private" school students scoring in the highest test quartile.

Table 1.12
Highest SES Quartile Sophomores in the Highest Math Quartile by School Control

School Control	Highest Math Quartile
Public	46.8
Catholic	49.0
Independent (NAIS)	75.3
Other Private	44.6

SOURCE: National Education Longitudinal Study of 1988 (NELS:88) First Follow-Up (1990) Student Survey, National Center for Education Statistics, U.S. Department of Education.

There is no significant difference, when *high-SES* students are compared, in the likelihood of scoring in the top math test quartile, between public school sophomores, and sophomores either in Catholic schools or other private schools.[26] (To many it may seem that the yet more interesting issue--which we do not attempt to address here--is whether *low-SES* [or minority] students do better in Catholic [or non-Catholic private] than in public schools.)[27]

However, the large performance difference between public school sophomores and the 1 percent of sophomores in independent (NAIS) schools, though reduced, does indeed persist, and remains statistically significant. This result is unsurprising in that while NAIS students disproportionately fall into

[26]Readers of the base year descriptive summary of eighth graders (Hafner, Ingels, Schneider and Stevenson, 1990) may recall an additional illustration of this point. In examining mathematics and reading proficiency scores by race, controlling for SES deflated majority versus minority (black, Hispanic, American Indian) differences by 25 to 30 percent (p.31). While this may suggest that achievement viewed by racial/ethnic categories alone may present a misleadingly stark contrast, it is perhaps the more disturbing to see how racial differences in tested achievement persist, even after socioeconomic status has been taken into account. A further illustration from the NELS:88 data of the effect of controlling for SES while examining race/ethnicity differences comes from eighth to tenth grade dropout rates. The overall cohort dropout rate for whites is low (4.9 percent) compared to the 1988-1990 dropout rate for blacks (10.0 percent) and Hispanics (9.3 percent). Nonetheless, within the lowest SES quartile, the cohort dropout rate for whites is 16.8 percent (compared to 11.5 percent for blacks and 14.4 percent for Hispanics). Differences between the three groups proved statistically nonsignificant within the lowest SES quartile, where the dropout population is clustered (see Owings and Peng, 1992; Scott, Rock, Pollack & Ingels, 1994). HS&B data show black-white dropout rate differences reversing themselves and white-Hispanic differences greatly reduced when family background is taken into account (Barro and Kolstad, 1987). Likewise, low-ability whites, HS&B data suggest, are more likely to drop out than low-ability blacks and Hispanics: whites have higher dropout rates than blacks and Hispanics within the lowest HS&B test quartile (Griffith, Frase and Ralph, 1989).

[27]A conclusion drawn by some analysts of the HS&B data was that private--and in particular, Catholic--schools, though disproportionately white and high-SES in student composition, were conducive to higher average achievement for minority and disadvantaged students (Coleman, Hoffer, and Kilgore, 1982; Coleman and Hoffer, 1987). This more equitable distribution of achievement is sometimes attributed to a "common school effect"; Sebring and Camburn (1991) report evidence of this effect in the math and reading performance of low-SES and minority (that is, black and Hispanic) Catholic school eighth graders in their NELS:88 base year analyses. Similar findings of a diminished achievement gap (contrasting Catholic schools to public) were found in NAEP math and science results analyzed by Lee and Stewart (1989). Even when sophisticated controls for student background characteristics are introduced, however, it remains difficult to establish conclusively, within a non-experimental design, that such differences represent school effects, as contrasted to self-selection effects--examination of this extremely interesting question is beyond the scope and analytic apparatus of this report.

the highest socioeconomic quartile, NELS:88 base year and first follow-up analyses suggest that the curriculum of this particular category of private school is unusually rigorous.[28]

Mathematics is but one of four subjects on the NELS:88 test battery. We will therefore proceed to examine the topic of learning and achievement in relation to science. Thereafter, we will similarly explore sophomore achievement in social studies and reading. However, before approaching these three additional NELS:88 test subjects, we shall briefly examine reported course taking in foreign languages.

[28]For example, in the base year, eighth graders in NAIS schools reported doing twice as much homework as did students in public schools (5.4 hours of homework per week for public school eighth graders, compared to 10.7 hours for NAIS eighth graders [Hafner, Ingels, Schneider and Stevenson, 1990, Fig. 3.2, p.51]). This report suggests that 1990 sophomores in NAIS schools were far more likely to have completed an advanced math sequence than sophomores in any other school type (63 percent for NAIS sophomores, versus 23 percent for both public and Catholic school sophomores, and 32 percent for sophomores in other private schools.)

CHAPTER 2: COURSE-TAKING PATTERNS AND INSTRUCTIONAL PRACTICES: FOREIGN LANGUAGE, SCIENCE, SOCIAL STUDIES, AND ENGLISH

This chapter examines four subject areas--course-taking in *foreign language*; course-taking and instruction in *science*; and course-taking in *social studies* and in *english*. If educational achievement is to be regarded as the chief of the many possible goals of education, two questions assume critical importance. One is how to maximize achievement, and the other is how to achieve equity in its distribution. Policies that attempt to maximize achievement for all depend on educational factors that are manipulable, that is, that can be altered.

A number of instructional and subject-matter variables (including opportunity to learn, that is, exposure to new knowledge; quality of instruction; and hours of homework) are alterable factors that may mediate the effects of background. Two potentially alterable factors that influence achievement will be examined in this chapter. These two factors are patterns of high school *course enrollment*, and *instruction*.

Instructional techniques can in principle be manipulated to improve educational results. Likewise course enrollment is, within important limits, an alterable factor. Indeed, there is ample evidence that enrollment patterns (and program placement) have changed over recent decades, with declines in rigorous academic coursework in the 1970s followed by more recent gains. For example, HS&B and NELS:88 transcript data (*Condition of Education, 1994*, pp. 76-79) show that 48.4 percent of 1982 seniors had taken geometry, compared to 70.4 percent of 1992 seniors. Some 31.6 percent of 1982 graduates had taken chemistry, compared to 55.5 percent of 1992 graduates. In addition, the percentage of college-bound high school graduates taking at least 2 years of a foreign language in high school increased 18 percentage points between 1982 and 1992, from 55 to 73 percent.

Learning depends on having the opportunity to be exposed to new knowledge as well as on aptitude and the willingness to expend effort. Enrollment in particular courses or course sequences provides the basic opportunity to learn specific content and skills. Course enrollment is influenced both by policy (for example, graduation or program completion requirements) and by student choice. High school students have a role in selecting their courses. Their course choices may be influenced by their perceptions of their ability, by their aspirations, and by the perceived benefit of completing a given course. Hence course-taking is alterable in the sense that more students can be encouraged to take key courses such as foreign language, students can be given more information about the consequences of their course selections, or required (by state, district, or school regulations) to take more years of English, or more rigorous course sequences in science, and so on. Students whose social milieu and family background include disproportionately few college graduates may, in particular, have less access to the information about postsecondary academic requirements that would enable them to perform an accurate cost-benefit analysis of their curricular options (see, for example, Kilgore & Pendleton, 1993, p. 72).

While curricular choices are important, and can be influenced by better guidance or revised program or graduation requirements, it must be recognized that such choices are also constrained. Opportunities to learn depend on a complex ensemble of factors that both influence curricular choice and affect its meaning. In particular, the cumulative effect of past inequalities of opportunity to learn may, by sophomore year, be considerable. This is because prior achievement or prerequisite knowledge severely limits curricular choices available to high school students.

Students have unequal opportunities to learn--the amount, and even more, the kind and quality of instruction received by students--is highly variable. Research has demonstrated that course offerings

vary across schools, that differences exist in the amount of material covered in courses in different "tracks", and that differences exist in the amount of instruction provided to students within the same classroom but in different ability groups (Dreeben & Gamoran, 1986; Dreeben & Barr, 1988). In various ways, track or program assignment may influence the courses students select. Expectations, too, reflect past experience and influence present curricular choices. Grades and earlier performance affect not only the expectations of the student and the student's family but also the expectations of peers and teachers. Course-taking may be influenced as well by sociodemographic composition and organizational characteristics of the school.[1]

Even granting these qualifications, course-taking remains a principal potentially alterable factor in learning. Course-taking can be influenced by policy. Policies may require more stringent course sequences. If many students with high postsecondary aspirations do not take optimal preparatory course sequences, policies that encourage dissemination of information to students and their families about the importance of certain courses to later outcomes may prove efficacious. Educational policies may also attempt to address school-level differences in the quantity and quality of course offerings and in students' prior preparation.

2.1 FOREIGN LANGUAGE

Earlier, we cited work based on High School and Beyond (HS&B) data that indicated foreign language may act as a "gatekeeper" course, associated with a significantly greater likelihood of college attendance. Pelavin and Kane (1990) report that 86 percent of 1982 high school graduates with two years of foreign language attended college. Further, they found that foreign language-taking was related to a reduced gap in likelihood of college entry for black and poor students when compared to white students or students from more prosperous families, though foreign language enrollment did not significantly reduce the college attendance gap between Hispanic and white students.

The NELS:88 cognitive test battery supplies no information about achievement levels in foreign languages. Nonetheless, NELS:88 provides student reports of foreign language coursework completed in eighth, ninth and tenth grades. Data from the NELS:88 base year indicate that less than a quarter of the nation's spring 1988 eighth graders reported that they were enrolled in a foreign language, with over half of students in the northeast enrolled but less than a fifth in the other three regions of the nation, and with over twice as many highest SES quartile eighth graders (36 percent) enrolled in foreign language as lowest SES quartile (16 percent) (Rasinski & West, 1990).

High school typically offers more opportunity for foreign language enrollment than does eighth grade, and high school foreign language course enrollments increased over the course of the 1980s.[2] Apparently, 70.4 percent of 1990 graduates had completed at least one year of foreign language in high

[1]Kilgore and Pendleton (1993) describe the ways that the organizational context of schooling affects opportunity to learn. In addition, they use HS&B data to examine how high school organizational context influences enrollment in academic (algebra, geometry, and more advanced) mathematics. See also Garet and DeLaney (1988).

[2]The mean number of credits in foreign language (or Carnegie Units, that is, completion of a course that meets one period a day for one academic year) for HS&B graduating seniors in 1982 was 1.05, whereas the mean number of credits for NAEP 1990 graduates was 1.62 (see Legum et al., 1993); the standard error for the estimate of 1.62 in 1990 is 0.04, and the standard error for the estimate of 1.05 in 1982 is 0.03.

school, compared to 48.8 percent of 1982 graduates (Legum et al., 1993).[3] Table 2.1 below indicates that around 60 percent of 1990 sophomores completed at least a year of foreign language study in ninth or tenth grade.

It is important to know not only how much foreign language is being taken but also *who* is taking foreign language courses, since the answer to this question has possible implications for instructional equity in high school as well as postsecondary educational access. For this reason, the background characteristics of sophomores in relation to their foreign language course enrollment are also depicted below. More specifically, Table 2.1 below shows amount of coursework taken for different racial/ethnic, school control, socioeconomic status, and gender groups, as well as for students with different levels of postsecondary expectations.

[3]The estimate that 70.40 percent of 1990 graduates had at least one year of foreign language coursework (one Carnegie Unit) had a standard error of 1.14; the corresponding estimate for 1982 HS&B graduates (48.77) had a standard error of 0.97.

Table 2.1
Foreign Language Coursework, by Background Characteristics

	Less than 1 YEAR*	1-1.5 YEARS	2 YEARS
Total	38.5%	24.4%	37.2%
Race/Ethnicity			
Asian	24.8%	22.0%	53.2%
Hispanic	38.9	32.6	28.5
Black	49.8	23.6	26.7
White	36.8	23.6	39.6
American Indian	59.0	19.8	21.2
School Control			
Public	40.7%	25.0%	34.4%
Catholic	11.2	15.4	73.4
Independent (NAIS)	10.5	6.4	83.1
Other private	36.7	34.3	29.1
Socioeconomic Status			
Low	56.8%	26.0%	17.1%
Middle	45.8	24.2	30.0
Middle	35.2	24.5	40.3
High	19.3	23.0	57.7
Gender			
Male	43.6%	22.9%	33.6%
Female	33.5	25.8	40.7
College Expectations			
No College	67.2%	21.5%	11.3%
Some College, Won't Graduate	46.6	27.6	25.9
Graduate, Graduate Plus	25.7	24.4	49.9

*Some 34.1 percent of sophomores report that they had taken no coursework in foreign language in ninth or tenth grade.

Note: Owing to rounding, rows may not sum to 100 percent.

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 2.1 shows that there are many striking differences in the pattern of foreign language coursework when background characteristics are compared.

Race/ethnicity

- If we focus in particular on those sophomores who have taken the most foreign language (that is, have been continuously enrolled through ninth and tenth grade), there are significant differences between whites and all other racial/ethnic groups. Asians are more likely than whites to have taken 2 years of a foreign language by the spring term of sophomore year, but whites are more likely to have completed 2 years of coursework than are Hispanics, Blacks, or American Indians. Specifically, 40 percent of whites have completed 2 years of foreign language by spring of the sophomore year, as compared to 53 percent of Asians, 29 percent of Hispanics, 27 percent of blacks, and 21 percent of American Indians.

School control type

- We can compare students in public and private schools. Public school students are significantly more likely to be in the low or middle foreign language group than are Catholic or independent school students.

- Catholic and independent school sophomores are significantly more likely than public school or other private school sophomores to fall in the highest group, that is, to have taken 2 years of foreign language by spring of the sophomore year. Viewed in terms of the highest completion level, 83 percent of independent school students and 73 percent of Catholic school students have completed 2 years of foreign language, as contrasted to only 34 percent of public school students and 29 percent of students in non-Catholic, non-NAIS private schools.

- There are no significant differences at any of the three levels between sophomores in public schools and other private schools.

Socioeconomic status (SES)

- If we contrast the lowest and highest SES quartiles, there are no significant differences for the middle group of foreign language coursework but significant differences may be seen for the low foreign language and very high foreign language groups. Lowest quartile SES sophomores are almost three times more likely to fall into the group having either no or no more than one semester of foreign language in ninth or tenth grade than highest quartile SES sophomores. (The highest SES group is almost three times as likely to have taken a full 2 years of foreign language in ninth and tenth grade as is the lowest SES group (58 percent versus 17 percent).

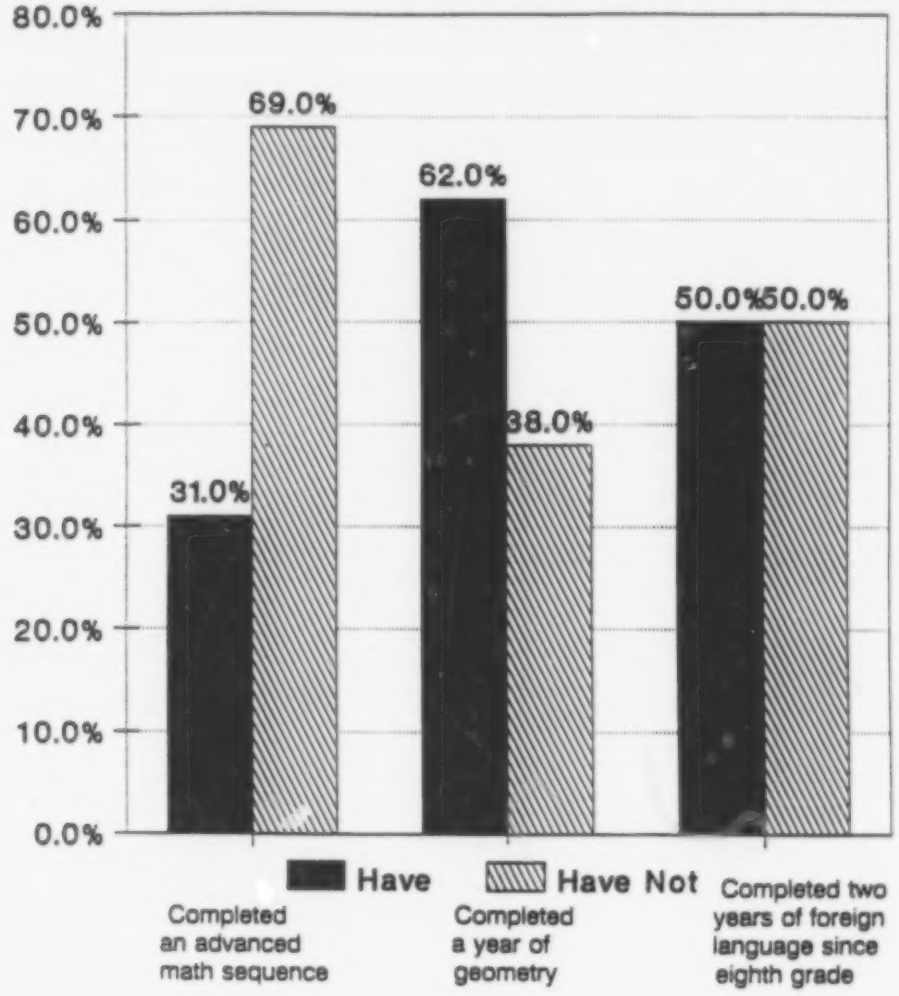
Gender

- There are significant male-female differences across all three levels. In particular, males are more likely to fall into the low foreign language coursework group in ninth and tenth grade (44 percent of males and 34 percent of females fall into this category), while females are more likely to have taken a full 2 years of foreign language over this period (34 percent of males versus 41 percent of females).

Finally, **postsecondary expectations** are related to foreign language course-taking. Sophomores who expect to complete a college education were over four times as likely to have completed two years of foreign language than were sophomores with no college expectations (50 percent versus 11 percent). Fully two thirds of sophomores who do not expect to go on to college have taken no foreign language or only a semester; about half of those who expect to graduate from college have taken two or more years of foreign language, and over a quarter of those who expect to attend but not graduate from college have taken two years of foreign language during ninth and tenth grade. If enrollment in foreign language courses continues, in the 1990s, to be as important a predictor of who goes to college as was the case in the 1980s, the fact that half of those who expect to graduate from college had not completed a two-year foreign language sequence as sophomores may be reason for concern. Examination of NELS:88 1992 data for seniors will reveal how much additional foreign language coursework was completed in the remaining two years of high school, and the characteristics of those who chose further language study.

Figure 2.1 depicts the percentage of sophomores who expect to graduate from college or obtain advanced degrees, viewed by whether they have or have not completed two years of foreign language since leaving eighth grade. It extends this comparison to those who have completed an advanced math sequence or a year of geometry as well, matters that were discussed in the previous chapter.

Figure 2.1--Math and Foreign Language coursework of sophomores who expect to graduate from college or higher



Note: The statement "since eighth grade" means since the beginning of ninth grade. The exact wording of this item on foreign coursework is: "From the beginning of ninth grade to the end of this school year, how much coursework will you have taken in each of the following subjects? Count only courses that meet at least three times (or three periods) a week for at least one half year. Also include summer school courses taken in 1988 or 1989 that counted for one half year of more."

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

2.2 SCIENCE

Along with mathematics, science learning is seen as essential to technological progress and global competitiveness, and as in the case of mathematics, American students have fared poorly in a number of comparisons with students elsewhere (Lapointe, Mead & Phillips, 1989). Ironically, although American students are thought to lag behind those of many other countries in their science achievement, the NELS:88 base year to first follow-up results show that a good deal of science learning takes place between eighth and tenth grade; indeed, not only was the size of gains in science substantial, but of the four tested content areas in NELS:88, the area in which students gained most was in science (Scott, Rock, Pollack, & Ingels, 1994). Moreover, males made greater gains than females between eighth grade and tenth, students in the highest SES quartile gained significantly more than did students from the lowest SES quartile, with greater gains associated also with doing more than two hours of science homework per week and with course-taking sequences that involved biology or biology plus physics and chemistry (Scott, Rock, Pollack & Ingels, 1994).

Data from the National Assessment of Educational Progress (NAEP) indicate that for ages 13 and 17--the ages just above and just below the modal age of 1990's sophomores--national performance in science declined in the 1970s but improved in the 1980s. Nevertheless, for 17 year olds, science achievement was lower in 1990 than in 1969 (Mullis, Dossey, Foertsch, Jones & Gentile, 1991).

Just as mathematics education has been the object of many recent reform efforts, so too has science education. While nothing equivalent to the NCTM's mathematics standards has been created for high school science, prototype science standards for curriculum, teaching, and assessment are being developed by the National Academy of Science at this time. Such standards would in many ways parallel, and be coordinated with, the mathematics standards developed by the NCTM. The standards are expected to emphasize an inquiry-based approach to science and opportunities to practice science skills outside the formal school classroom. The new science standards will be animated by four broad learning goals: (1) to convey understanding of a limited number of basic concepts, laws, principles, and theories of science; (2) to teach students how to employ the chief modes of scientific reasoning and inquiry; (3) to inculcate an understanding of the scientific enterprise; and (4) to convey a sense of the history of scientific development and its relationship to technology, culture, and the historical and social context (National Academy of Science; 1992).

Educational reform has also had the effect of stiffening graduation requirements in science. Transcripts data show that graduating seniors in 1990 had taken significantly more science than the HS&B seniors who graduated in 1982. The mean number of credits for 1990 graduates translates into 2.8 years of science, compared to 2.2 years for HS&B's 1982 seniors.[4] In addition to increased overall enrollment, enrollment in more rigorous science courses has increased also. For example, when the percentage of graduates with at least a year of credit each in biology and chemistry is compared, 48.2 percent of 1990 graduates had earned credit of a year each in biology and chemistry, compared to 28.0 percent for 1982 graduates.[5]

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[4]These data are taken from Legum et al., 1993; for the 1990 estimate of 2.82 years (Carnegie Units) of science the standard error was 0.03; for the 1982 estimate of 2.19 years, the standard error was 0.02.

[5]These data from the 1990 High School Transcripts Study and the 1982 HS&B Transcripts Study appear in Legum et al. 1993. For the 1990 estimate of 48.2 percent of graduates with two Carnegie units (two year-long courses) in biology plus chemistry, the standard error was 1.26. For the 1982 estimate of 28.02 percent of graduates with two Carnegie units in biology plus chemistry, the standard error was 0.63.

We will examine the school experience and science achievement of sophomores in the 1989-90 school year by exploring two facets of this topic:

- *the science courses that sophomores have taken since eighth grade;*
- as reported by students, *the instructional practices, objectives and emphases of the science classroom;*

A tabular summary of tested achievement in science in relation to student background factors and curricular and instructional factors is provided in Appendix D.

2.2.1 Science Course-taking

NELS:88 results for eighth graders in the spring of 1988 showed that overwhelmingly eighth graders were enrolled in science (96 percent reported being enrolled in a science course) though, at eighth-grade level, science tends not to be differentiated into an array of biological and physical science courses. While 4 percent were not enrolled in science, 21.5 were enrolled in a laboratory science course, and 74.2 percent in a science course without laboratory (Hafner, Ingels, Schneider & Stevenson, 1990, Table 2.5). There was a marked disparity in likelihood of being enrolled in a laboratory science by family background: 28 percent of those in the highest SES quartile were enrolled in laboratory science compared to 17 percent of those in the lowest quartile (Rasinski & West, 1990, Table 1.1). Within public schools, high-SES students were more than twice as likely as low-SES students to report conducting daily science experiments (19 percent versus 9 percent); over half (50.5 percent) of lowest SES quartile public school eighth graders were in classes where science experiments were conducted about once a month or less, with 27.8 percent of highest SES quartile eighth graders in classes conducting experiments in the once a month or less range. Overall, 41 percent of public school students were minimally (that is, no more than once a month) exposed to scientific experimentation (Horn & Hafner, 1992) in their eighth grade science classes.

NELS:88 results for sophomores in the spring of 1990 show that most tenth graders are enrolled in science, (see Table 2.2) and that the science curriculum has become more diverse for high school students. Biology, chemistry and physics are the science courses most typically taken by the college-bound. Nevertheless, at this early juncture in high school--sophomore year--it is far more common for sophomores to have taken either biological sciences, or such less cognitively demanding courses (which in many cases do not include laboratory work) as general science, physical science, earth science, or principles of technology, than advanced physical sciences such as chemistry or physics among NELS:88 sophomores. Just 3 percent of sophomores have taken a year of physics; less than 15 percent of sophomores have taken chemistry. On the other hand, 77 percent have completed a year of biology, and substantial numbers of students have completed lower-level science courses such as general science or earth science (20 and 23 percent respectively have completed a year or more of these courses). A good deal of advanced coursework in science--particularly in courses such as physics and chemistry--will, of course, take place in the junior and senior years of high school.

Table 2.2

Science Coursework Taken

SCIENCE

	None	1/2 year	1 year	More than 1 year
General science	73.0	3.2	20.3	3.7
Physical science	55.9	5.0	37.4	1.6
Biology	13.3	5.8	77.3	3.6
Earth science	71.3	4.7	23.1	.9
Chemistry	82.3	2.4	14.9	.4
Principles of technology	98.2	.7	.9	.2
Physics	95.3	1.5	2.7	.4
Other science	89.4	2.8	6.9	.9

Note: Because the above percentages reflect sophomores only, they normally do not match percentages in the codebook of the NELS:88 first follow-up student component data file user's manual.

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey. U.S. Department of Education, National Center for Education Statistics.

2.2.2 Instructional Practices, Resources, and Emphases in the Science Classroom

Reforms recommended for science education are broadly similar to those recommended in mathematics. Emphasis on science as a process of discovery, with concepts to be mastered through inquiry rather than memorization, including discussion with teacher and peers, has been a hallmark of reform recommendations.[6] Improvement of textbooks; decreased reliance on textual materials and lecture; and greater emphasis on laboratory experimentation and oral and written reporting of experiments, real-life situations, group and project work, hands-on manipulation of science materials, and use of tools such as computers and calculators, all are important subthemes in the call for improved science education. To what degree do contemporary high school science classrooms reflect these emphases already? Sophomores report the frequencies shown in Table 2.3 for key instructional activities and use of instructional resources:[7]

[6]See, for example, the National Research Council's *Fulfilling the Promise: Biology Education in the Nation's Schools* (1990).

[7]Teachers of the 1990 sophomore cohort were also asked to report on their science teaching practices, including frequency of use of various teaching methods, emphasis given to various objectives, and frequency of activities such as use of computers for instruction, discussing career opportunities in science, and so on. While first follow-up teacher data have not been included in this report, base year teacher data on science instruction are analyzed and reported in Horn and Hafner, 1992.

Table 2.3 Classroom Activities and Resources: Frequency of Various Instructional Practices in the Science Classroom

In your most recent or current science classes, how often do/did you...

	Very rarely	Once a month	Once a week	Almost every day	Every day
1. Review the work from the previous day?	23.6	3.2	25.5	34.3	13.5
2. Make your own choice of science topic or problem to study?	74.1	10.2	9.8	3.9	1.9
3. Copy the teacher's notes from the blackboard?	12.1	5.8	19.7	32.2	30.2
4. Write up reports of laboratory and practical work?	32.2	22.2	32.2	9.7	3.7
5. Use a book or other written instructions that show you how to do an experiment?	26.2	17.6	32.1	15.5	8.5
6. Make up your own problems and work out your own methods to investigate the problems?	75.1	11.4	8.2	3.8	1.5
7. Design and conduct experiments or projects on your own?	76.7	13.4	6.6	2.2	1.0
8. Use computers to write up experiments or reports?	88.2	6.5	3.1	1.4	.8
9. Use computers for collecting and/or analyzing science data?	91.3	4.4	2.4	1.1	.8
10. Use computers to do calculations?	89.5	3.5	3.2	2.3	1.6
11. Use computers for models and simulations?	91.3	3.7	2.2	1.5	1.3
12. Listen to the teacher lecture?	7.7	4.3	13.1	33.5	41.5
13. Discuss career opportunities in scientific and technological fields?	62.7	20.0	10.7	4.5	2.1
14. Watch the teacher demonstrate or lead you in an experiment or systematic observation?	23.2	24.9	31.2	12.9	7.8

*5% had not taken a science class, and were excluded from the calculations above

Note: Owing to rounding, rows may not sum to 100 percent. Because the above percentages reflect sophomores only, they normally do not match percentages in the codebook of the NELS:88 first follow-up student component data file user's manual.

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

These responses show a clear pattern of prevalence of conventional over recommended instructional methods, and for most students, of lack of intense involvement with key resources for science learning such as computers. For example, the relatively passive learning techniques of copying teacher notes from the blackboard are cited by 62 percent of students as every day or almost every day occurrences in their science classes. Although the desirability of lessened dependence on the lecture and recitation method of teaching has been stressed by science education reformers, three quarters of students indicated that every day or almost every day they listen to the teacher lecture. In terms of active, self-directed, inquiry-based approaches to science learning, three quarters of 1990 sophomores indicate that they very rarely (a "never" response category was not offered; very rarely effectively means from never to less than once a month) make up their own problems and work out their own methods to investigate them. Likewise, 77 percent indicate that they very rarely design and conduct experiments or projects on their own, and 74 percent responded that they very rarely make up their own choice of science topic or problem to study.

While lectures and blackboard notes are commonly utilized, more contemporary learning resources such as computers appear to be little utilized. Some 88 percent of 1990 sophomores indicate that very rarely do they use computers to write up experiments or reports; 91 percent indicate that they very rarely use computers for collecting and/or analyzing science data; 89 percent indicate that they very rarely use computers to do calculations, and 91 percent indicate that they very rarely use computers for modeling or simulation.

In addition to looking at classroom practices and resources, however, another window into what is happening in science classes is provided by NELS:88 questionnaire items that ask sophomores to report their judgments on how much emphasis teachers place on various science objectives, such as increasing their interest in the subject, learning and memorization of science facts and procedures, thinking about problems and their solutions, and so on. The table below portrays student responses to this series of questionnaire items.

Table 2.4
Student Perception of Teacher Instructional Emphasis

In your most recent or current science class, how much emphasis does/did the teacher place on the following objectives?

	None	Minor Emphasis	Moderate Emphasis	Major Emphasis
1. Increasing your interest in science	14.5%	27.5%	39.6%	18.4%
2. Learning and memorizing science facts, rules, and steps	7.4	19.8	38.3	34.5
3. Preparing you for further study in science	12.1	25.2	36.8	25.9
4. Thinking about what a problem means and the ways it might be solved	11.9	25.0	37.3	25.7
5. Showing you the importance of science in daily life	13.3	26.6	32.9	27.3

Note: Owing to rounding, rows may not sum to 100 percent. Because the above percentages reflect sophomores only, they normally do not match percentages in the codebook of the NELS:88 first follow-up student component data file user's manual.

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

It is instructive to examine responses to these items in terms of the major emphases that are affirmed. In decreasing order of frequency of responding, around 35 percent of 1990 sophomores declared learning and memorizing science facts, rules, and steps to be a major emphasis in their science classes. At very similar levels, showing the importance of science in daily life (27 percent), preparing the student for further science study (26 percent), and thinking about the meaning of a problem and methods for solving it (26 percent) were seen as major emphases. Lagging behind was "increasing your interest in science" with 18 percent of sophomores reporting this as a major emphasis. From the point of view of curriculum reform in science education, these results show that the major planks of a reform orientation-increased attention to problem solving, demonstration of connections of science to everyday problems, increasing the student's interest in science--are seen as major emphases in their classrooms by only 18 to 27 percent of sophomores. However, typically 60 percent or more of sophomores say that these objectives receive moderate or heavy emphasis in their classrooms.

2.2.3 Tested Achievement

While test results are not discussed in this chapter, they are provided for interested readers in Appendix D of this report, which contains tables that show the tested science achievement of the nation's sophomores in the spring of 1990 in relation to a number of student characteristics and instructional factors. These characteristics and factors include race or ethnicity, school sector, family socioeconomic status, gender, science coursework level, frequency of writing lab reports, and degree of emphasis on factual and problem-solving objectives.

2.3 SOCIAL STUDIES AND ENGLISH

The National Council for the Social Studies has defined social studies as the "integrated study of the social sciences and the humanities to promote civic competence." Three specific social studies subjects--history, citizenship, and geography--were included in the NELS:88 cognitive test battery. The first follow-up student questionnaire gathered information about course taking in a variety of social studies subjects and inquired into students' perceptions of their social studies teachers' classroom practices as well.

While all but 4 percent of eighth graders were enrolled in history or social studies in 1988 (Rasinski & West, 1990, Table 2.1) just over a quarter of 1990 sophomores report that they are not currently enrolled in a social studies course. Although diverse social studies courses are available, by sophomore year, only world history has been taken by half or more of American students. (See Table 2.5.) For students who remain in school, additional social studies courses will typically be taken in the last 2 years of high school. Since leaving eighth grade, however, just under a third had taken a year or more of U.S. history, while 71 percent had taken no high school geography, 74 percent had not taken civics or government, and 85 percent had not been enrolled in economics. On the other hand, more than four-fifths of sophomores report having taken English courses in both ninth and tenth grades. For the convenience of interested readers, summary reading and social studies test results are provided in Appendix D.[8]

Table 2.5
Academic Coursework Taken

	None	1/2 year	1 year	>1 year
Social Studies				
World history	31.0%	7.2%	53.2%	8.6%
U.S. history	63.6	5.3	27.4	3.7
Geography	70.6	10.7	17.4	1.4
Government/civics	74.0	11.7	13.5	.9
Economics	85.0	8.3	5.5	1.2
Language				
English Language	1.9%	1.2%	16.1%	80.8%

NOTE: Owing to rounding, rows may not sum to 100 percent. Because of their restriction to sophomores only, these percents do not normally match the weighted percents reported in the first follow-up student component data file user's manual codebook.

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey. U.S. Department of Education, National Center for Education Statistics.

[8] Readers may also wish to compare NELS:88 grade 8 and 1990 grade 10 reading results with the rich national and international 1991 grade 9 reading assessment findings of the IEA International Reading Literacy Study (*Reading Literacy in the United States: Technical Report* and *Reading Literacy in the United States: Findings from the IEA Reading Literacy Study*, NCES 1994; and, forthcoming from NCES, *Reading Literacy in an International Perspective*.)

CHAPTER 3: MAKING DECISIONS ABOUT SCHOOLS, FRIENDS, AND EMPLOYMENT

Today's teenagers confront important decisions that can have a lasting impact on their lives. By sophomore year, the selection of certain high school classes can greatly influence postsecondary plans and future employment options. Yet it remains unclear how much initiative and responsibility tenth graders take in deciding what classes they enroll in, how they spend their time out of school, or whether they get a job. Citing major changes in the structure of the American family, some researchers have argued that many adolescents are making these critical decisions with limited guidance from parents or schools.

This chapter examines how tenth graders and their families make choices about school classes, postsecondary education, and employment. Specific attention is given to parental regulation, that is, the limits families place on student time with friends, watching television or playing video games, and doing homework. Also of interest is the amount of time sophomores spend working at a job and the type of work they engage in.

3.1 FAMILY INTERACTION: DECISION MAKING ABOUT SCHOOLING AND WORK

Section 3.1 examines the scope of student and family decision making on three topics: *high school classes*, *college attendance*, and *after-school employment*. Results suggest that many teenagers perceive that they make these decisions primarily by themselves rather than in consultation with their parents. Many others report joint decision making with their parents; few report that such decisions are made for them by their parents. However, the extent of teenage autonomy in decision making varies depending on family socioeconomic status.

3.1.1 Decisions on school classes:

NELS:88 sophomores were asked "In your family, who makes most of the decisions on each of the following topics?" The topics included "What classes I take in school" as well as "Whether I should go to college." Students were given five response options:

1. My parent(s) decide themselves;
2. My parent(s) decide after discussing with me;
3. We decide together after discussing;
4. I decide after discussing it with my parent(s); and
5. I decide by myself.

NELS:88 sophomores are more likely to decide on their own, than in consultation with their parent, the classes they will take in high school. (See Table 3.1.) While 43 percent of the sophomores report making this decision by themselves, 28 percent report making course decisions after consulting with their parents and 21 percent report making the decision jointly with their parents.

Table 3.1
Percentage of tenth graders making decisions on which classes, by selected background characteristics

Student Characteristics	Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
TOTAL	2.5	5.9	21.1	27.5	43.0
GENDER					
Male	3.2	6.9	20.8	25.8	43.4
Female	1.9	5.0	21.5	29.1	42.6
RACE					
Asian	1.9	7.3	18.2	25.4	47.2
Hispanic	2.2	5.3	20.5	21.8	50.3
Black	3.7	7.5	18.0	20.5	50.2
White	2.3	5.4	22.0	29.6	40.7
American Indian	4.3	17.6	13.8	16.3	47.9
FAMILY COMPOSITION					
Mother & Father	2.7	5.8	22.7	29.7	39.1
Father & Other Female	1.6	9.6	17.0	23.3	48.5
Father Only	1.3	4.5	24.1	28.5	41.6
Mother & Other Male	2.3	4.5	17.8	27.7	47.6
Mother Only	2.3	7.1	18.3	21.7	50.7
Other Adults	2.3	5.7	18.7	15.0	58.3
SOCIOECONOMIC STATUS					
Lowest Quartile	3.0	6.8	16.1	17.9	56.2
Second	2.4	5.9	19.4	24.8	47.5
Third	2.0	5.0	20.1	29.6	43.3
Highest Quartile	2.6	5.9	26.8	36.5	28.2
MATH GRADES					
Mostly A's	1.8	5.1	21.3	32.5	39.3
Mostly B's	2.8	5.7	23.0	26.9	41.6
Mostly C's	2.9	6.7	20.0	23.4	47.0
Mostly D's	3.2	5.2	14.2	21.3	56.2
SCIENCE GRADES					
Mostly A's	2.1	4.7	22.0	33.9	37.3
Mostly B's	2.2	6.6	22.1	26.7	42.4
Mostly C's	2.9	5.9	19.1	23.0	49.1
Mostly D's	3.5	6.5	16.7	18.9	54.2

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 3.1
Percentage of tenth graders making decisions on which classes, by selected background characteristics (continued)

Student Characteristics	Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
ADVANCED MATH					
Low	3.3	7.8	17.3	19.9	51.7
Middle	2.4	5.3	22.3	28.3	41.7
Advanced	2.0	5.2	22.3	33.4	37.2
ADVANCED SCIENCE					
Low	3.4	9.5	17.5	17.2	52.4
Middle	2.5	5.5	21.1	27.5	43.5
Advanced	2.4	6.3	22.7	32.0	30.7

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

In another 6 percent of cases parents decide after consulting with their child; in only 2.5 percent of cases are parents reported to make this decision for their child without their offspring's consultation.

The process of decision making regarding classes varies significantly by course and grade levels. Sophomores with lower grades and in lower level courses are more likely to report that they make class selections by themselves. For example, when *math grades* are considered, over 56 percent of tenth-grade students receiving mostly D's in mathematics report making decisions by themselves. This percentage is substantially higher than the 39 percent receiving mostly A's and the 42 percent receiving mostly B's who report making decisions on courses by themselves.

A similar trend can be found for *science grades*: 37 percent of 1990 sophomores receiving mostly A's and 42 percent of sophomores receiving B's report making course decisions on their own, whereas 54 percent of sophomores receiving mostly D's report individual decision making on classes.

Similarly, sophomores in *advanced math or science classes*[1] are less likely than those in lower level courses to report making course decisions on their own. Fifty-two percent of the tenth graders in low-level math classes compared to 37 percent of the advanced math students report making the decision by themselves. This pattern also applies to different levels of science classes, with 52 percent of sophomores in lower-level classes reporting that they make decisions by themselves compared to 31 percent of the students in advanced classes.

Family composition or structure appears to be related to the level of family involvement with sophomore course selections. (See Table 3.1.) Tenth graders in families with both natural parents are less likely to report making individual decisions on high school courses by themselves than students in less traditional families, with the exception of father-and-other-female and father-only families.

Table 3.1 also shows that individual student decisions on classes vary by *socioeconomic status*. Sophomores at the lowest socioeconomic level are more likely than those in other groups to report making class decisions by themselves. Specifically, 56.2 percent of lowest SES quartile sophomores report making course-taking decisions entirely by themselves, as contrasted to 28.2 percent in the highest SES quartile. The opposite trend occurs in the consulting categories; 36 percent of the students in highest SES quartile families report making course selections after discussion with parents, while 18 percent of the students in the lowest SES group report the same decision process. Stated a little differently, the majority (56.2 percent) of lowest SES quartile sophomores report making course selection decisions entirely on their own, while the majority of highest SES quartile sophomores (63.3 percent) report making such decisions either together with their parents (27.4 percent) or after consultation with their parents (35.9 percent).

With respect to *race and ethnicity*, family decision patterns in white families differ from those in Hispanic and black families. White tenth graders report lower levels of individual decision making on classes (41 percent) than Hispanics (50 percent) and blacks (50 percent). Differences among these percentages can be accounted for in the "student decides after discussion with parents" category, where 22 percent of the Hispanics and 21 percent of black tenth graders report this form of decision making occurs, as compared to 30 percent of white students.

3.1.2 Decisions on whether to go to college

Findings dealing with the decision of whether or not to go to college display a similar pattern to class selection decisions. Given the substantial costs and potential economic benefits that can accrue to the individual who pursues a postsecondary education, it is somewhat surprising that more tenth-grade students do not report making this decision with their parents. The consultative categories look very much the same as for course selections, with 28 percent of 1990 tenth graders reporting that they and their parents make this decision together; 20 percent report making the decision after consultation with parents.

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[1]The *advanced math* group comprises all sophomores who reported having taken at least one year of coursework in any (or any combination) of the following: algebra II, trigonometry, precalculus, and calculus. The middle group comprises those sophomores who did not qualify for the advanced group but reported taking one year or more of algebra I or geometry. The low-level math group consists of all remaining students. (These students had taken no math, or math courses such as general math, business math, and prealgebra, or less than a year of algebra or geometry). *Advanced science* was created by including individuals with a year or more of chemistry and physics. The middle science group comprises sophomores who did not qualify for the advanced group but reported taking one year or more from the following classes: biology, physical science, general science, earth science, or other science. The low science group is a residual category containing all other sophomores (including those who were enrolled in principles of technology).

Again, the largest category is "making the decision by myself," with 39 percent of sophomores reporting that they will make this decision by themselves (student decides vs. student discusses. (See Table 3.2.).

Student reports of decision making vary by *math and science grades*. Sophomores with low grades in math and science are more likely than sophomores with higher grades to report making decisions by themselves about whether to attend college. In particular, 37 percent of the mostly A's math students and 37 percent of the mostly B's math students report individual student decisions on college attendance while 49 percent of the mostly D's math students do so. This same relationship can be seen for science grades. Only 35 percent of the mostly A's science students and 37 percent of the mostly B's students report individual student decisions on college attendance, while 49 percent of the mostly D's students report the same.

Results according to *family background characteristics* show less autonomous sophomore decision making regarding college-going with better educated or higher SES parents. With respect to parent education, 45 percent of sophomores whose parents did not receive a high school diploma report making the decision to attend college by themselves, while only 30 percent of those with one or more parents educated to the doctoral level do so. Some 44 percent of lowest SES quartile sophomores report that they decide by themselves whether to attend college, contrasted to 32 percent of highest SES quartile sophomores who make this claim.

The decision-making process also varies by *parent education expectations*. Tenth graders who perceive their parents as having high expectations that they will finish higher levels of school report more interaction with parents on decisions concerning college attendance. For instance, the difference in percentages of students making decision alone is greatest between tenth graders in families where the expectation is to not graduate from high school (62 percent) and to receive some college (33 percent).

3.1.3 Preparing for college: Discussion of college examinations

One important component of postsecondary attendance is fulfilling the necessary prerequisites to apply to the school of choice. Sophomores were asked how often they discuss with their parents taking college entrance examinations, that is, the American College Test (ACT) and Scholastic Aptitude Test (SAT). As shown in Table 3.3, a small percentage of tenth graders report discussing the ACT or SAT tests with their parents. Nine percent of 1990 sophomores report discussing these tests "often" with their parents, whereas 53 percent of sophomores report "never" having discussed these tests.

Table 3.2
Percentage of tenth graders making decisions on whether or not to go to college, by background characteristics

Student Characteristics	Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
TOTAL	6.7	6.3	28.1	20.1	38.8
GENDER					
Male	7.1	6.8	28.0	18.2	40.0
Female	6.3	5.8	28.3	21.9	37.6
RACE					
Asian	12.9	10.1	29.0	14.0	34.1
Hispanic	8.5	8.3	28.7	17.0	37.5
Black	7.6	9.6	29.2	18.2	35.5
White	6.0	5.2	28.0	21.2	39.6
American Indian	3.4	19.6	21.2	10.6	47.2
FAMILY COMPOSITION					
Mother & Father	7.3	6.4	29.3	20.1	36.9
Father & Other Female	5.3	8.8	17.4	22.3	46.2
Father Only	4.4	4.0	33.5	15.9	42.3
Mother & Other Male	5.4	5.2	25.0	22.6	41.8
Mother Only	6.4	6.5	28.2	19.3	39.7
Other Adults	5.6	6.9	24.7	15.7	47.2
SOCIOECONOMIC STATUS					
Lowest Quartile	5.5	8.0	25.7	16.9	44.0
Second	5.3	6.3	25.6	21.0	41.9
Third	6.2	5.5	27.9	22.7	37.6
Highest Quartile	9.4	6.2	31.8	19.8	32.9
PARENT EDUCATION					
< H.S	5.6	8.1	24.7	16.7	45.0
H.S. graduate	5.3	6.6	25.3	19.8	42.9
1 to 4 year college	5.6	6.4	27.3	21.7	39.0
College graduate	8.0	6.2	32.2	20.1	33.6
M.A.	9.7	5.4	32.4	20.1	32.5
Ph.D.	14.7	4.4	33.7	17.1	30.2
MATH GRADES					
Mostly A's	6.4	5.9	29.3	21.6	36.9
Mostly B's	6.3	6.9	29.0	21.4	36.5
Mostly C's	7.1	5.7	26.8	17.7	42.7
Mostly D's	8.0	5.7	24.2	13.4	48.7

Table 3.2
Percentage of tenth graders making decisions on whether or not to go to college, by background characteristics (continued)

Student Characteristics	Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
SCIENCE GRADES					
Mostly A's	6.7	5.3	30.7	22.0	35.3
Mostly B's	6.4	7.1	27.8	20.6	38.2
Mostly C's	4.3	6.6	27.0	17.5	42.0
Mostly D's	6.0	5.3	20.4	18.9	48.8
EXPECTATIONS OF HOW FAR IN SCHOOL?					
Less than H.S.	6.9	9.7	9.3	11.7	62.4
H.S. Graduate	6.4	5.2	14.3	12.9	61.1
Trade School	4.3	5.0	20.7	20.8	49.2
Some College	6.0	8.0	31.3	22.2	32.5
College Graduate	6.9	6.9	32.3	20.5	33.4
M.A./Ph.D.	7.9	5.1	29.4	20.6	37.0

Source: National Educati[illegible] Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education St[illegible]atics.

Table 3.3
Percentage of tenth graders discussing preparation for the ACT/SAT test, by selected background characteristics

	Never	Sometimes	Often
TOTAL	53.4	37.7	8.9
GENDER			
Male	52.7	38.4	8.9
Female	54.1	37.1	8.8
RACE			
Asian	47.6	39.4	13.0
Hispanic	57.3	33.1	9.6
Black	42.9	40.7	16.4
White	54.9	37.9	7.3
American Indian	52.0	32.4	15.6
FAMILY COMPOSITION			
Mother & Father	50.8	39.3	9.9
Father & Other Female	66.5	29.2	4.3
Father Only	58.1	36.7	5.2
Mother & Other Male	57.2	36.0	6.8
Mother Only	55.9	36.1	8.0
Other Adults	59.9	31.5	8.6
SOCIOECONOMIC STATUS			
Lowest Quartile	62.5	30.0	7.5
Second	60.2	34.0	5.8
Third	54.0	37.0	9.0
Highest Quartile	39.4	48.0	12.6
PARENT EDUCATION			
< H.S	63.7	29.9	6.4
H.S. graduate	61.2	31.5	7.3
1 to 4 year college	56.4	36.2	7.4
College graduate	45.0	43.8	11.2
M.A.	36.6	48.8	14.6
Ph.D.	30.0	56.0	14.0
MATH GRADES			
Mostly A's	46.2	43.2	10.6
Mostly B's	54.3	36.3	9.5
Mostly C's	61.5	32.6	5.8
Mostly D's	66.8	28.6	4.5

Table 3.3
Percentage of tenth graders discussing preparation for the ACT/SAT test, by selected background characteristics (continued)

	Never	Sometimes	Often
SCIENCE GRADES			
Mostly A's	43.5	44.3	12.3
Mostly B's	55.1	37.6	7.3
Mostly C's	63.1	30.4	6.5
Mostly D's	71.7	23.3	5.0
EXPECTATIONS OF HOW FAR IN SCHOOL			
Less than H.S.	76.3	13.8	9.9
H.S. Graduate	77.4	18.2	4.4
Trade School	72.7	24.3	3.0
Some College	61.9	32.9	5.2
College Graduate	48.6	43.0	8.4
M.A./Ph.D.	37.3	47.1	15.6

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Discussion of the ACT and SAT varies by *racial and ethnic* group. Blacks are more likely than other groups to discuss these tests with their parents. Significantly lower percentages of black 1990 sophomores (43 percent) report they never discuss the ACT or SAT with their parents than do Hispanic (57 percent) or white (55 percent) students.

Family composition or structure also is related to discussions of the SAT and ACT. Sophomores in families headed by a father and other female guardian report the highest percentage (67 percent) of *never* talking about these tests. Significantly fewer tenth graders from traditional families, than other family compositions, report that they never discuss these tests with their parents.

Table 3.3 shows that 1990 sophomores in families with lower *socioeconomic status* report lower levels of discussion about these tests, with 63 percent reporting they never discussed them. This percentage is much higher than for high-SES sophomores, of whom only 40 percent report never discussing the ACT or SAT. Parent educational attainment is strongly associated with discussion of the ACT and SAT. Tenth graders with parents not graduating from high school report never discussing the tests at a rate of 64 percent, which is higher than for students with parents who received a Ph.D. (30 percent).

As expected, *parent educational expectations* are associated with the frequency of test discussions. The further in school the parent expects the tenth grader to go, the greater the number of times the family discusses these tests. Whereas only 37 percent of sophomores with parents expecting them to attain a master's degree or a doctorate report never discussing the ACT/SAT tests, 77 percent of sophomores

whose parents expect them only to graduate from high school never discuss the tests. The differences between percentages of discussion vary greatly between those who plan to graduate from high school and those who expect to complete some college or graduate from college. As Table 3.3 shows, the percentages of tenth-grade students reporting they never discuss the ACT/SAT tests declines dramatically as parental expectation increases from high school graduate (77 percent), to some college (62 percent), to college graduate (49 percent).

Finally, both *math and science grades* are positively associated with discussion of the ACT and SAT tests. Higher math and science grades are associated with more frequent parent test discussion. Sixty-seven percent of the mostly D's math students and 72 percent of the mostly D's science students report they never discuss preparation for these tests, compared to 46 percent of the mostly A's math students and 44 percent of the mostly A's science students.

3.1.4 Decisions on student employment

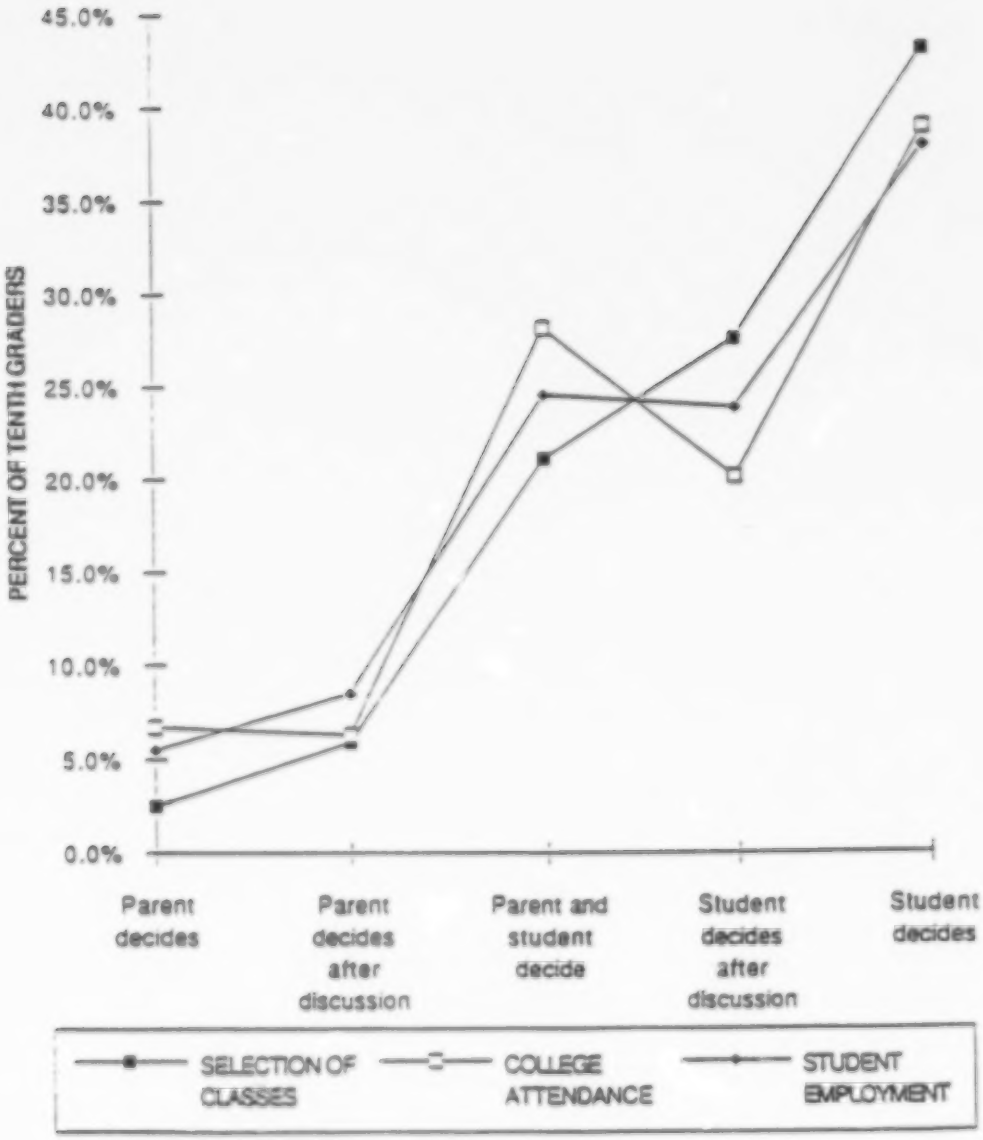
Sophomore decision making on employment is similar to college attendance and classes-- the largest proportion of students is in the "I make the decision by myself" category. (See Figure 3.1.) Concerning who makes the decisions on whether or not a tenth grader will have a job, 38 percent of the students indicate that they make the decision by themselves, 24 percent make the decision after discussion with parents, and 25 percent make the decision together with parents.

Adolescent decision making on employment varies by *socioeconomic status* similarly to the decision-making experiences found for class selections. As shown in Table 3.4, as socioeconomic status increases, individual student decision-making decreases. Of the 1990 sophomores in the low-SES category, 44 percent report individual decision making on whether or not to seek employment, while 32 percent of high-SES sophomores do so.

The least frequently reported jobs held by tenth graders who decided alone to hold a job are lawn workers and camp counselors. Thirty-one percent of tenth graders who decided alone to hold a job work as lawn workers and thirty percent work as camp counselors. The most frequently reported jobs held by tenth graders who decided alone to hold a job are fast food waiter/waitress or worker and hospital/health workers. Approximately 44 percent of tenth graders who decided on their own to hold a job are employed as fast food or hospital/health workers.

Overall, it appears that many adolescents in families with the fewest amounts of social resources are making important decisions with limited input from their parents. Socioeconomic status is consistently linked with lower levels of joint student-parent decision-making. Higher levels of socioeconomic status are related to more collaborative decision-making experiences for adolescents, at least, concerning selection of curricular offerings, choice of whether to pursue postsecondary education, and after-school work for pay. Students' decision making on classes and college attendance also appears related to grades. Disproportionately high levels of individual decision making are associated with lower grades.

FIGURE 3.1
SOPHOMORE PERCEPTIONS OF LOCUS OF DECISION MAKING:
HIGH SCHOOL CLASS SELECTION, EMPLOYMENT,
WHETHER TO ATTEND COLLEGE



Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 3.4
Percentage of tenth graders making decisions on whether or not to have a job, by selected background characteristics

Student Characteristics	Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
TOTAL	5.5	8.5	24.5	23.8	37.8
GENDER					
Male	5.2	9.4	23.2	22.9	39.3
Female	5.8	7.7	25.7	24.6	36.3
RACE					
Asian	8.1	11.2	23.3	23.5	33.9
Hispanic	6.1	8.7	24.4	20.6	40.2
Black	5.7	9.7	22.4	19.6	42.5
White	5.2	8.0	25.0	25.0	36.8
American Indian	4.2	18.0	15.4	12.0	50.3
FAMILY COMPOSITION					
Mother & Father	6.0	8.7	25.5	24.6	35.3
Father & Other Female	4.7	12.7	24.4	15.2	43.0
Father Only	3.0	11.7	23.2	19.4	42.7
Mother & Other Male	4.8	6.1	23.0	28.2	38.0
Mother Only	4.6	8.1	23.0	20.7	43.6
Other Adults	5.4	9.5	19.4	20.9	44.9
SOCIOECONOMIC STATUS					
Lowest Quartile	6.3	9.0	20.8	20.5	43.5
Second	5.5	8.2	23.0	24.4	38.8
Third	4.8	8.3	25.3	24.0	37.6
Highest Quartile	5.4	9.2	27.2	26.0	32.2
JOB TYPE					
Not Employed	7.1	9.9	25.3	22.6	35.2
Lawn Worker	4.8	12.3	25.9	26.3	30.7
Fast Food/Waiter	3.8	7.0	21.3	24.4	43.4
Paper Route	5.0	7.7	20.8	31.9	34.6
Babysitter	5.2	7.9	25.2	29.9	31.9
Camp Counselor	2.4	18.7	29.5	17.2	30.3
Farm Worker	6.0	10.0	20.6	21.6	41.9
Fact/Man/Const.	5.2	7.9	23.5	23.0	40.4
Store Clerk	3.3	6.1	24.9	25.5	40.3
House Cleaning	7.7	7.3	24.5	30.2	30.3
Office/Cleaning	4.9	4.4	27.5	26.4	36.8
Hospital/Health	2.8	4.2	23.1	26.2	43.8
Other	3.9	6.0	25.4	23.7	41.1

Table 3.4
Percentage of tenth graders making decisions on whether or not to have a job, by selected background characteristics (continued)

Student Characteristics	Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
HOURS/WEEK					
0-10 hours	4.1	7.4	26.8	26.9	34.8
11-20 hours	4.3	7.9	22.5	25.0	40.3
21-30 hours	3.7	6.3	24.0	23.9	42.0
31-40 hours	5.3	5.3	22.7	24.8	41.9
Over 40 hours	5.2	14.7	18.3	15.9	46.0

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

3.2 PARENTAL REGULATION:

Section 3.1 examined who tenth graders perceive as making decisions about school, postsecondary experiences, and work. The following investigates the kinds of supports and constraints encountered by adolescents through parental-imposed regulation. The extent of parent regulation can be viewed as an indicator of adolescents' perceptions of their degree of autonomy. We examine parent regulation in three areas: limits on time with friends, checking of homework, and limits on television viewing.

3.2.1 Limiting time with friends

The most extensive amount of parental regulation can be seen in time spent with friends. Table 3.5 shows the percentage of 1990 sophomores responding that they "often" are regulated in this manner, 33 percent; this is the same as in the "sometimes" category, but roughly twice as much as the remaining low-regulation categories of "rarely" and "never."

Interesting *gender* relationships are seen for limitation of time with friends. A higher percentage of females report being regulated "often" (37 percent female to 30 percent male), with this difference being accounted for by higher reported percentages for males in the "rarely" and "never" columns.

Family composition, however, does not appear to be related to parental regulation of time spent with friends. No significant pattern is apparent in the percentages reported in Table 3.5.

But the data do suggest that an adolescent's *socioeconomic status* is related to limits on the amount of time he or she can spend with friends. The reported percentages of parents "never" limiting time with friends is seen to rise as socioeconomic status decreases, with low SES students differing significantly from high SES students. Conversely, in the "sometimes" column, the percentages rise with increasing socioeconomic status, again, with low SES students differing significantly from high SES students.

Table 3.5
Percentage of tenth graders responding to questions regarding the frequency of their parent(s) limiting time with friends by selected student characteristics

	Often	Sometimes	Rarely	Never
TOTAL	33.4	33.4	18.5	14.6
GENDER				
Male	30.0	33.9	20.7	15.5
Female	36.7	33.0	16.5	13.7
RACE				
Asian	34.0	30.6	22.2	13.2
Hispanic	35.9	31.4	18.0	14.7
Black	37.4	25.5	20.5	16.6
White	32.7	35.1	18.1	14.1
American Indian	19.3	35.3	20.7	24.7
FAMILY COMPOSITION				
Mother & Father	33.5	35.6	18.0	12.9
Father & Other Female	37.0	27.2	21.9	13.9
Father Only	22.7	32.2	20.9	24.3
Mother & Other Male	42.4	28.5	15.8	13.3
Mother Only	28.7	31.5	22.2	17.6
Other Adults	26.2	28.0	17.4	28.4
SOCIOECONOMIC STATUS				
Lowest Quartile	31.6	29.8	19.5	19.0
Second	33.1	34.0	18.2	14.8
Third	34.7	32.1	20.2	13.1
Highest Quartile	34.6	37.1	16.7	11.7
PARENT EDUCATION				
< H.S	34.0	27.1	18.2	20.7
H.S. graduate	31.8	33.5	18.2	16.5
1 to 4 year college	33.2	33.9	19.6	13.3
College graduate	34.8	32.9	18.5	13.8
M.A.	36.5	35.3	17.3	10.9
Ph.D.	35.2	39.4	14.1	11.4
MATH GRADES				
Mostly A's	32.0	35.3	18.9	13.9
Mostly B's	35.2	32.6	18.0	13.6
Mostly C's	33.5	32.7	18.4	15.4
Mostly D's	36.2	28.5	19.2	16.1
SCIENCE GRADES				
Mostly A's	34.1	34.0	19.4	12.4
Mostly B's	32.9	34.9	17.6	14.5
Mostly C's	34.0	31.6	18.0	16.3
Mostly D's	33.4	29.5	19.8	17.2

Source: National Education Longitudinal Study of 1988: First Follow-up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Interestingly, the data suggest that parental regulation of a sophomore's time with friends is unrelated to the student's *math or science grades*. Neither of these subject grades shows a statistically significant relationship to parental regulation of time spent with friends. This is noteworthy in comparison to the significant relationship between grades and family decision-making patterns.

3.2.2 Checking homework

This type of regulation--checking homework--occurs less frequently than parental limitation of adolescents' time with friends. Table 3.6 shows that the proportion of sophomores reporting that their homework is checked "often" and "sometimes" is more than ten percentage points lower than the corresponding frequencies for parental limitation of time with friends (67 percent to 57 percent).

Higher *socioeconomic status* is associated with higher frequencies of homework checking. As socioeconomic status changes from low to high, the percentages of sophomores reporting their homework was never checked by parents decreases from 23 percent to 13 percent. This is the same pattern found for parental regulation of tenth graders' time with friends. Also, the reported percentages of 1990 sophomores having their homework checked often increases as socioeconomic status changes from low to high. In the low-SES category, 22 percent of the students report their homework is checked often while 30 percent of tenth-grade students in the high-SES category respond similarly.

3.2.3 Limiting television viewing:

Of the three types of parental regulation examined in this chapter, the limitations by parents on sophomores' television watching or video game playing are the smallest. Table 3.7 shows that only 10 percent of students report being limited often. The percentage of respondents reporting they had never been limited in these activities is high, at 43 percent. Also interesting is the relationship between *gender* and this type of regulation. While only 39 percent of the males surveyed report they are never regulated in this manner, 46 percent of the females respond that they are never limited in their television and video game activities.

Racial-ethnic differences are also of note. Asian sophomores are limited much more frequently compared to tenth graders of other ethnic groups, the percentage never receiving limitations is only 29 percent. This percentage is much lower than the percentages for all other ethnic groups--in particular for blacks, with almost half (47%) of black sophomores reporting their television or video game time is never limited.

In terms of *family structure*, the percentage of students in families with both natural parents who report *"never"* being limited in television watching or video game playing is much lower, 39 percent, than the percentages for students from most other family types, in particular "other adult or relative" families (53%), "mother and other male" families (49%), and "mother-only" families (49%).

Table 3.6
Percentage of tenth graders responding to questions regarding the frequency of their parent(s) checking homework by selected student characteristics

	Often	Sometimes	Rarely	Never
TOTAL	25.8	30.7	25.9	17.6
GENDER				
Male	25.6	32.7	24.7	17.0
Female	26.0	28.8	27.0	18.2
RACE				
Asian	25.7	33.4	26.4	14.6
Hispanic	26.3	37.5	22.0	18.2
Black	30.8	32.11	22.8	14.3
White	24.9	30.1	26.9	18.1
American Indian	33.8	22.9	22.8	20.5
FAMILY COMPOSITION				
Mother & Father	27.7	30.9	25.8	15.6
Father & Other Female	22.7	25.5	31.7	20.1
Father Only	16.6	31.7	25.5	26.2
Mother & Other Male	22.7	32.7	26.5	18.1
Mother Only	24.1	29.1	25.5	21.3
Other Adults	22.5	29.4	21.8	26.3
SOCIOECONOMIC STATUS				
Lowest Quartile	21.8	29.5	25.7	23.1
Second	22.4	29.1	28.4	20.1
Third	27.4	30.7	26.5	15.4
Highest Quartile	30.1	33.1	23.7	13.1
PARENT EDUCATION				
< H.S	21.0	30.4	24.0	24.5
H.S. graduate	22.8	28.1	27.7	21.4
1 to 4 year college	24.3	31.1	27.3	17.3
College graduate	30.8	31.7	23.8	13.7
M.A.	32.8	31.8	22.8	12.7
Ph.D.	29.7	35.7	20.7	13.9
MATH GRADES				
Mostly A's	26.8	28.2	27.0	18.1
Mostly B's	27.0	33.6	23.5	15.8
Mostly C's	24.1	30.1	27.6	18.2
Mostly D's	18.3	30.7	28.4	22.6
SCIENCE GRADES				
Mostly A's	28.4	30.2	24.7	16.6
Mostly B's	24.3	31.6	27.0	17.1
Mostly C's	25.4	30.7	26.4	17.5
Mostly D's	20.1	26.7	27.8	25.4

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 3.7

Percentage of tenth graders responding to questions regarding the frequency of their parent(s) limiting the amount of television watched or video games played, by selected student characteristics

	Often	Sometimes	Rarely	Never
TOTAL	9.6	20.7	26.9	42.8
GENDER				
Male	9.2	22.5	29.3	39.0
Female	10.0	19.0	24.6	46.4
RACE				
Asian	16.5	26.5	28.0	29.0
Hispanic	10.2	25.4	22.9	41.5
Black	9.7	19.3	23.9	47.2
White	9.2	19.9	27.9	43.0
American Indian	7.3	30.3	19.2	43.2
FAMILY COMPOSITION				
Mother & Father	10.6	22.7	27.5	39.2
Father & Other Female	12.2	16.2	30.0	41.9
Father Only	5.4	20.8	22.1	51.8
Mother & Other Male	8.4	16.5	26.0	49.1
Mother Only	7.2	17.7	26.5	48.6
Other Adults	7.0	17.9	21.9	53.2
SOCIOECONOMIC STATUS				
Lowest Quartile	8.2	18.1	23.7	49.9
Second	6.2	19.0	27.5	47.2
Third	9.3	20.3	27.3	43.1
Highest Quartile	13.4	24.4	28.6	33.7
PARENT EDUCATION				
< H.S	8.0	16.9	22.9	52.2
H.S. graduate	6.1	18.3	26.4	49.2
1 to 4 year college	8.8	20.4	26.9	44.0
College graduate	12.6	22.2	29.5	35.7
M.A.	14.1	24.7	26.3	35.0
Ph.D.	16.7	29.4	28.5	25.4
MATH GRADES				
Mostly A's	10.4	20.5	28.0	41.2
Mostly B's	9.5	22.4	25.9	42.2
Mostly C's	9.3	18.5	28.2	44.0
Mostly D's	7.4	20.1	21.9	50.7
SCIENCE GRADES				
Mostly A's	10.7	22.1	27.6	40.0
Mostly B's	9.4	21.2	26.6	42.8
Mostly C's	9.4	18.8	26.9	44.8
Mostly D's	5.6	18.5	23.1	52.8

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Socioeconomic status is related to limitation of television and video games, with low SES being related to less regulation. The percentage of tenth-grade students with parents holding less than a high school diploma reporting they are never limited in their television or video game usage (52%) is more than double the percentage for the students with parents with Ph.D.'s (25%). Consistent with the other types of parental regulation examined in this section, "family resources" are seen to be related to the levels of parental regulation of television and video game usage. Once again, higher levels of family resources appear to be associated with higher levels of parental regulation.

Overall, with the exception of television and video games, the amount of regulation on tenth graders is at relatively high levels. The other two types of regulation (limitation of time spent with friends and homework checking) had a majority of the responses in the "often" and "sometimes" columns. SES and family structure appear to be important variables in parent-child interactions. The resources in the home, as measured by family income, occupational, and educational status, and, to a lesser extent, as measured by family structure, show significant positive relationships with parental guidance of tenth graders, as exhibited by three types of parental regulatory behavior.

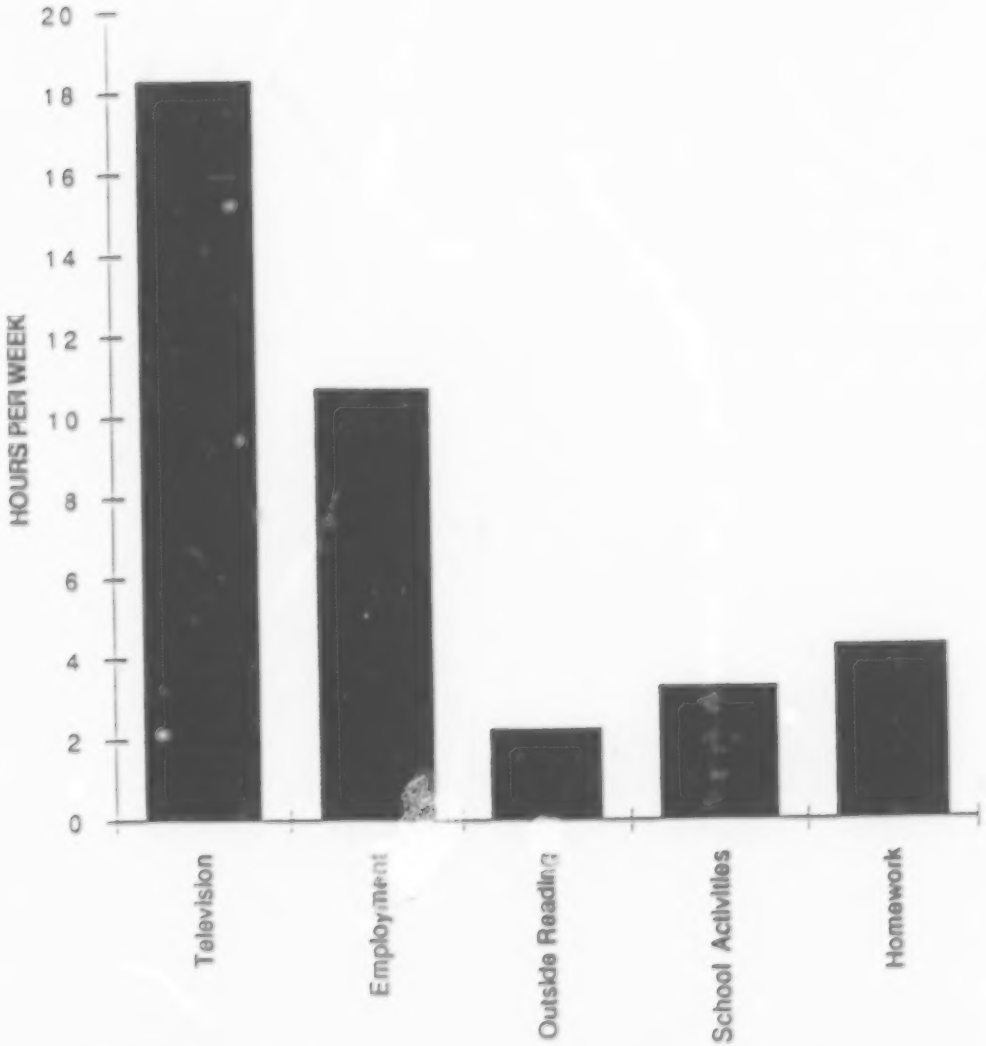
3.3 HOW STUDENTS SPEND THEIR TIME: TELEVISION, WORK, HOMEWORK, EXTRACURRICULAR ACTIVITIES, AND READING

The previous sections have investigated the decision-making patterns and the discussion levels between parents and their tenth-grade children, as well as the types of limitations parents impose upon their children. A further question is how sophomores actually spend their time outside of the classroom. Figure 3.2 displays the number of hours the average tenth grader spends per week on five distinct activities: television, homework, paid work, school-sponsored extracurricular activities, and outside reading. As was found with NELS:88 base year data, television viewing appears to occupy a large portion of out-of-school time, at 18.3 hours per week.[2] The average time spent in job activities is lower, averaging 10.7 hours per week. In contrast, the two activities directly connected to schooling, time spent on homework and school-sponsored extracurricular activities, occupy much less of the adolescent's time, than either television viewing or work), at 4.3 and 3.3 hours per week, respectively.

Figure 3.3 displays the average time allocations for these five activities for sophomores at different science grade levels. Clearly, this figure shows that higher amounts of time spent on outside activities centered around the school, such as homework and extracurricular activities, are positively related to higher science grades. For instance, at the lowest grade level (mostly D's or below), 1990 sophomores average only 1.6 hours per week of school-sponsored extracurricular activities. As student grades increase towards mostly A's, students average consistently higher levels of participation in extracurricular activities (peaking at 4.8 hours per week).

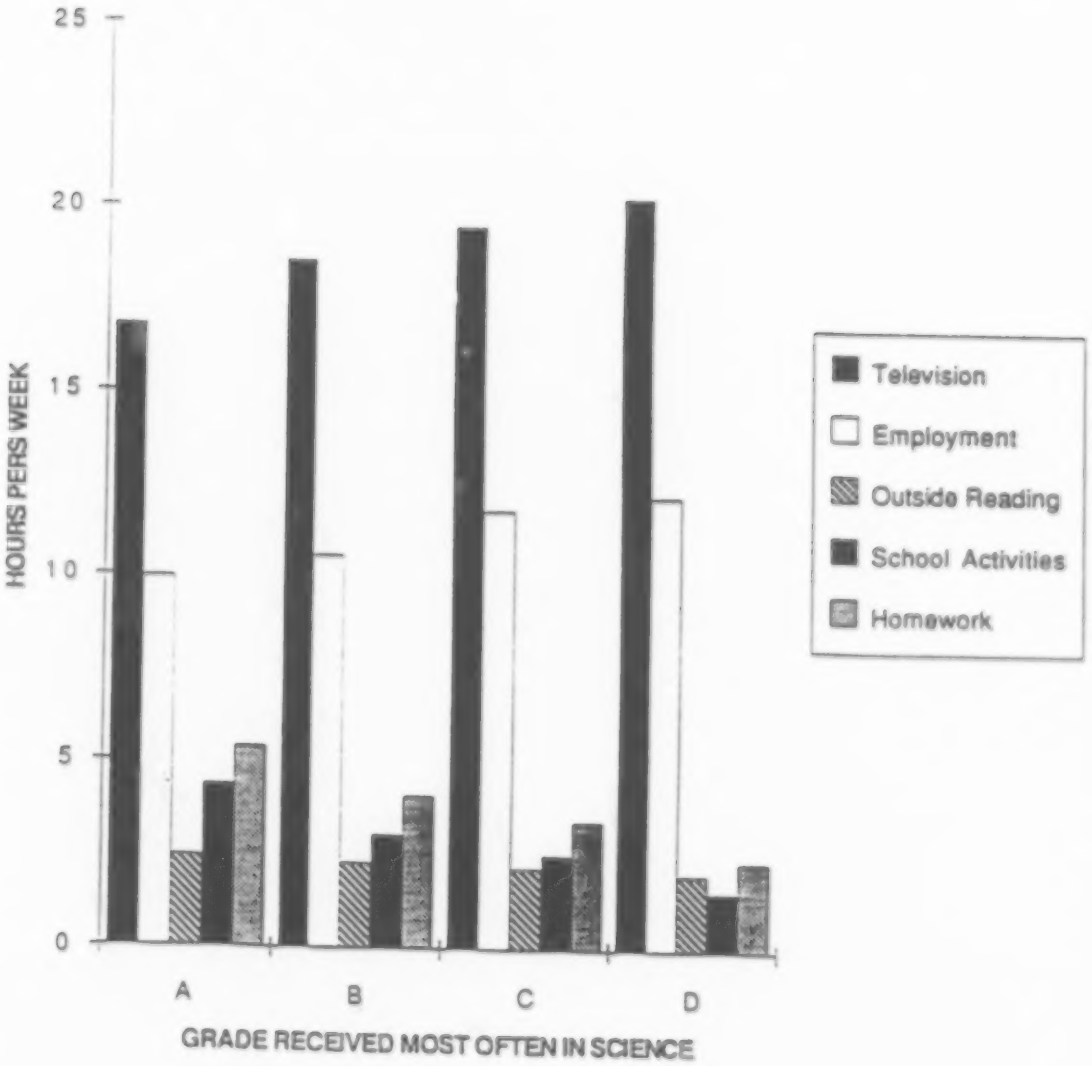
[2]The comparable figure for the NELS:88 nationally-representative eighth grade sample in 1988 was 21.4 hours per week of television viewing. Eighth graders in 1988 reported spending 1.8 hours per week in outside reading, and 5.6 hours per week doing homework (Hafner, Ingels, Schneider and Stevenson, 1990, Figure 3.1, p.48).

FIGURE 3.2
AVERAGE TIME SPENT BY TENTH GRADERS ON FIVE OUT-OF-SCHOOL ACTIVITIES



Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

FIGURE 3.3
AVERAGE TIME SPENT BY TENTH GRADERS ON FIVE OUT-OF-SCHOOL ACTIVITIES BY GRADE RECEIVED MOST OFTEN IN SCIENCE



Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 3.3 also shows a negative relationship between activities not centered around the school, such as watching television or working a job, and science grades. Sophomores in the lowest grade category, on average, watch 3.7 more hours of television per week than students in the highest category. Additionally, tenth graders in the lowest grade category, on average, work 2.5 more hours per week on outside jobs. Together, these activities constitute a shift toward non-school-related activities, perhaps at the expense of a student's involvement in other school-related activities. Outside reading does not vary greatly across different grade levels, averaging 2.3 hours per week.[3]

3.3.1 Employment experiences

After television viewing, employment seems to be one of the most prominent activities in an adolescent's life. Overall, the data on employment activities show that a large number of sophomores are involved in jobs outside of school, with 58 percent of students reporting they are employed. (See Table 3.8.) This is consistent with the other findings in this chapter that reveal a great deal of adolescent autonomy. Of employed respondents, 44 percent report they have identifiable occupations (14 percent of the students report their employment under the job category "other"). The number of respondents reporting that they are not working is 42 percent.

Of those sophomores with identifiable jobs, about one-quarter of the students hold fast food/waiter jobs (14 percent of the total student sample); they worked predominantly between 11 and 30 hours per week, and earned wages generally in the $3.35 to $4.99 range. Other frequently held jobs are store clerk (7 percent of total sample), baby sitter (6 percent of total sample), and factory/manual labor/construction jobs (5 percent of total sample). The hours and earnings for store clerks are roughly the same as for fast food/waiter jobs. However, the hours for baby sitter are usually less than 10 hours per week and the wages less than $3.35 per hour. Baby-sitting jobs account for a disproportionate share of the jobs in the low-paying category. Students in factory/manual labor/construction jobs work much longer hours than most students (many working over 30 hours a week) and earn more than most students (mostly over $4.99 per hour).

Some *gender* differences may be discerned. Lawn work/odd jobs, factory/manual labor/construction jobs, and farming jobs are mostly occupied by males, while baby sitting is mainly a female-held job (10 percent of females compared to 1 percent of males). As noted above, the job of baby sitting is very low paying. Also, the percentage of females not working is 48 percent, while the percentage for males is 12 percentage points lower, at 36 percent. Even the job of fast food waiter/waitress or worker, which accounts for the largest portion of sophomore employment, is associated with gender; though, unlike factory and construction jobs which are predominately held by males, more females than males hold fast food service jobs. Fifteen percent of females compared to 12.0 percent of males hold fast-food jobs.

In terms of *race/ethnicity*, Asian, Hispanic, and black students are more likely than white students to never have been employed. Hispanic tenth graders have the highest nonemployment rate (52%), followed closely by Asian (51%) and black (49%) tenth graders.

Employment status does not appear to be associated with *family composition*.

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[3]Nor did the amount of outside reading appear to increase over the course of the reform-minded 1980s. While both NAEP and NELS:88 test data show higher achievement levels for those who do more outside reading, trend data from NAEP covering the period 1984 to 1990 indicate "that there has been little change across time at any age level in the percentage of students who read for fun on their own time" (Mullis, Dossey, Foertsch, Jones and Gentile, 1991; p. 138). Comparison of HS&B 1980 sophomore data with NELS:88 1990 sophomore data confirm the NAEP finding of little if any change in reading habits--just 41 percent of 1980 sophomores indicated that they read for pleasure at least once or twice per week, and the same low figure (41 percent) was reported by sophomores in 1990 (Rasinski, Ingels, Rock and Pollack, 1993).

Table 3.8
Percentage of tenth graders employed in the following jobs by selected background characteristics

	Lawn Worker	Fast Food/ Waiter	Paper Route	Baby-sitter	Camp Counselor	Farm Worker	Fact/Man Const	Store Clerk	House Cleaning	Office/ Cleaning	Hospital/ Health	Other
TOTAL	3.81	13.50	1.08	5.71	1.29	2.82	4.97	6.58	0.66	2.66	0.46	14.54
GENDER												
Male	7.28	12.24	1.88	1.15	1.51	4.77	9.34	5.95	0.28	1.48	0.48	17.81
Female	0.49	14.71	0.31	10.08	1.09	0.94	0.78	7.18	1.03	3.80	0.45	11.42
RACE												
Asian/Pacific Isl.	2.21	11.75	0.72	2.75	1.12	0.24	4.14	6.93	0.32	4.13	0.20	14.47
Hispanic	2.10	10.17	0.70	3.65	0.63	0.90	4.65	6.86	1.20	2.64	0.87	13.90
Black	1.80	14.04	0.19	5.80	1.00	0.59	3.52	5.14	1.10	2.92	1.24	13.97
White	4.46	13.97	1.29	6.14	1.45	3.55	5.30	6.73	0.51	2.53	0.31	14.73
American Indian	3.23	10.05	0.52	4.88	0.53	3.00	3.71	4.95	2.92	4.09	0.00	14.42
FAMILY COMPOSITION												
Mother & Father	4.13	12.12	1.20	5.27	1.47	3.20	5.23	6.90	0.52	2.59	0.44	13.98
Father & Other Female	2.34	18.27	0.50	5.15	0.76	3.88	6.06	4.15	0.63	1.90	0.41	18.33
Father Only	9.44	9.22	0.56	2.79	1.03	3.83	2.91	4.60	0.88	2.06	0.00	20.85
Mother & Other Male	2.65	16.49	1.02	6.01	1.10	2.16	3.79	6.56	0.97	2.46	0.43	17.25
Mother Only	3.01	15.13	0.97	6.21	0.87	1.50	4.96	6.31	0.92	3.55	0.49	12.90
Other Adult	2.24	19.24	0.71	14.01	1.14	1.94	5.49	5.66	0.24	2.74	0.90	12.36
SOCIOECONOMICS STATUS												
Low	3.11	15.27	0.58	4.54	0.33	3.31	4.78	5.78	1.02	1.67	0.48	14.35
Middle	3.30	13.52	1.11	6.49	0.99	3.17	5.26	6.57	0.65	2.57	0.36	14.99
High	5.50	11.27	1.45	5.42	2.66	1.91	4.43	7.05	0.44	3.50	0.38	14.07
HOURS/PER WEEK												
0 - 10	10.16	16.47	5.11	17.35	1.30	2.69	5.67	7.67	2.45	5.35	0.60	25.17
11 - 20	5.18	28.79	0.79	6.17	2.17	3.65	6.97	15.95	0.56	3.57	0.70	25.51
21 - 30	3.29	29.38	0.29	5.94	2.25	4.58	7.37	14.44	0.21	4.43	1.58	26.25
31 - 40	5.46	19.60	0.07	7.80	3.50	7.20	17.72	7.46	1.05	6.92	0.41	22.80
Over 40	9.02	13.74	0.05	8.94	4.53	18.77	16.89	2.31	1.01	1.96	0.64	22.13

Table 3.8
Percentage of tenth graders employed in the following jobs by selected background characteristics (continued)

	Lawn Worker	Fast Food/ Waiter	Paper Route	Baby-sitter	Camp Counselor	Farm Worker	Fact/Man Const	Store Clerk	House Cleaning	Office/ Cleaning	Hospital/ Health	Other
WAGES/PER HOUR												
Less than $3.35	4.70	17.40	4.96	34.1	4.36	6.07	3.12	4.61	1.09	2.91	0.32	16.37
$3.35 - $3.99	3.69	34.34	0.60	4.33	1.41	2.68	6.96	13.17	0.85	4.61	0.45	26.92
$4.00 - $4.99	5.39	25.78	1.17	4.61	2.38	5.96	7.72	15.12	0.62	4.82	0.54	25.88
Over $4.99	9.23	12.20	1.34	5.04	1.29	5.47	16.61	11.92	2.25	6.42	1.88	26.36
MATH GRADES												
Mostly A's	4.73	11.76	1.54	6.04	1.67	2.71	4.60	6.43	0.67	3.33	0.38	13.91
Mostly B's	2.68	14.06	0.84	5.66	1.49	2.76	5.26	6.56	0.39	2.21	0.55	15.05
Mostly C's	3.40	14.73	0.83	5.98	0.61	2.89	4.85	7.27	0.85	2.26	0.42	15.81
Mostly D's	6.18	16.70	0.48	4.27	0.49	3.76	5.27	5.31	1.50	2.72	0.52	13.11
SCIENCE GRADES												
Mostly A's	3.95	12.05	1.29	6.02	1.76	3.03	4.69	6.41	0.49	3.30	0.37	13.44
Mostly B's	4.20	13.48	0.95	5.58	1.34	2.78	5.06	6.28	0.70	2.29	0.38	15.26
Mostly C's	3.29	15.52	0.83	4.93	0.79	2.56	5.06	7.42	0.72	2.46	0.61	15.30
Mostly D's	2.85	17.58	1.15	4.96	0.15	3.37	5.32	7.69	0.89	1.45	1.15	14.01
TEST QUARTILE												
Lowest	4.05	14.95	0.43	3.99	0.62	2.63	5.43	5.27	0.56	1.46	0.37	14.82
25 - 49%	3.46	15.87	0.81	5.59	0.77	3.08	4.51	6.13	0.91	2.42	0.25	13.62
50 - 75%	3.86	11.91	1.05	6.39	1.07	2.78	5.46	6.80	0.44	2.52	0.68	15.37
Highest	4.15	11.97	1.89	6.56	2.68	3.12	4.48	6.63	0.62	3.68	0.28	14.39

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

CHAPTER 4: PLANS FOR THE FUTURE

Eighth grade and twelfth grade mark critical transition points for students. While the sophomore year offers no such dramatic point of decision and change, tenth grade is nonetheless a significant time for students as they adapt to high school and make plans for their futures. Most sophomores are attending the schools that will see them through their high-school years. The majority of sophomores are within the first or second year of adjusting to the secondary school curriculum, to a new school, and--since there are about twice as many schools with eighth grades as with tenth grades--to a blend of other students from different prior school contexts.

All sophomores face large choices about their futures. The majority of tenth graders plan to pursue some sort of postsecondary education; for them, certain steps toward these goals assume great importance. Other students are quite sure that they will not pursue a postsecondary education and are looking toward other experiences, such as entering the labor force after high school, or are disenchanted with school and are contemplating dropping out.

NELS:88 provides evidence of the great variation in students' past school experiences, family backgrounds, and relations with adults and peers. Clearly, no two tenth graders are exactly alike in these experiences and characteristics, any or all of which may influence students' tenth grade performance as well as their plans for the future.

This chapter presents findings about how confident tenth-grade students are of graduating from high school and how far beyond high school they expect to go. To examine whether the nation's sophomores are aware of the steps necessary for attaining their expectations, we examine students' plans for taking the standard college entrance exams. In addition, in order to gain some understanding of the influences on high school sophomores as they think about their futures, we examine student reports of what their school counselors think is most important for them after high school and, within the family, the expectations their mothers have for them. In both areas of investigation, differences among various subgroups are highlighted.

4.1 EDUCATIONAL EXPECTATIONS

Expectations of completing high school. Before discussing postsecondary expectations, we must ask how confident students are of completing high school. Table 4.1 displays the percentage of tenth graders giving various responses to the question, "How sure are you that you will graduate from high school?" Overall, 86 percent say they are very sure of graduating. An additional 12 percent say they will probably graduate while 1.6 percent say either that they probably will not graduate or they are very sure that they will not graduate.

No significant differences are seen in these responses by gender. By race and ethnicity, however, Hispanic students are less likely (74%) to report than Asian (83%), black (86%), and white (89%) students that they are very sure of graduating from high school. At the opposite extreme of educational expectations, black students are more likely than white students to report that they probably will not graduate or are very sure of this. Among blacks, 2.7 percent give one of these two responses while only 1.2 percent of white students give responses in these categories. No other significant differences were observed among the racial/ethnic subgroups.

TABLE 4.1. Percentage of 10th grade student giving various responses to the question "How sure are you that you will graduate from high school?"

	Very sure I'll graduate	I'll probably graduate	I probably won't graduate	Very sure I won't graduate
TOTAL	86.4	12.1	0.7	0.9
GENDER				
Male	85.9	12.5	0.8	0.9
Female	86.8	11.7	0.6	0.9
RACE				
Asian	83.0	15.2	0.9	1.0
Hispanic	73.5	24.0	1.9	0.6
Black	86.4	11.1	1.1	1.6
White	88.5	10.3	0.4	0.8
American Indian	79.7	17.1	0.6	1.9
PARENTS' EDUCATION				
< H.S.	74.1	22.8	1.5	1.6
H.S. graduate	83.1	14.6	0.7	1.6
1 to 4 year college	87.0	11.3	0.7	0.9
College graduate	92.4	7.3	0.2	0.2
Graduate degree	93.9	5.7	0.1	0.4
SOCIOECONOMIC STATUS				
Lowest Quartile	76.7	20.0	1.4	1.9
Second	84.8	13.6	0.7	1.0
Third	90.0	9.0	0.5	0.6
Highest Quartile	93.3	6.2	0.1	0.4
OLDER SIBLINGS WHO HAVE DROPPED OUT BEFORE GRAD				
I don't have any	86.0	12.3	0.6	1.1
None are in H.S. yet	88.5	10.2	0.7	0.6
None left school	88.9	10.2	0.4	0.5
One left school	81.1	15.6	1.8	1.5
Two left school	73.8	23.5	1.2	1.6
CLOSE FRIENDS WHO HAVE DROPPED OUT BEFORE GRAD				
None of them	89.9	9.1	0.2	0.8
some of them	78.4	19.0	1.7	0.9
Most of them	69.2	22.4	4.3	4.1
All of them	79.0	13.8	1.3	5.9

TABLE 4.1. Percentage of 10th grade student giving various responses to the question "How sure are you that you will graduate from high school?" (continued)

	Very sure I'll graduate	I'll probably graduate	I probably won't graduate	Very sure I won't graduate
TEST QUARTILE				
Lowest Quartile	72.0	24.0	2.1	1.9
Second	84.6	14.4	0.4	0.7
Third	92.8	6.6	0.2	0.4
Highest Quartile	97.1	2.9	0.0	0.0
HIGH SCHOOL PROGRAM				
General	84.4	14.1	0.6	0.9
Academic	95.4	4.0	0.1	0.5
Vocational/Technical	78.9	16.7	1.9	2.5
Other	80.7	17.9	1.0	0.4
Don't Know	70.2	26.7	1.9	1.3
SCHOOL TYPE				
Public	85.9	12.4	0.7	1.0
Catholic	92.8	6.7	0.1	0.5
NAIS	92.4	7.3	0.0	0.3
Other Private	93.1	6.6	0.0	0.3

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

The association between parents' education and their children's educational expectations is apparent, as only 74 percent of those tenth-grade students whose parents did not finish high school and 83 percent of those students whose parents were high school graduates but went no further say they are very sure of graduating while 94 percent of those whose parents have graduate degrees give this response. Conversely, 3.1 percent of the students whose parents did not finish high school say they probably will not graduate or are very sure of this, while only 0.4 percent of the students whose parents are college graduates and 0.5 percent of those whose parents have graduate degrees give either of these responses.

Similar trends are seen in the relationship between student educational expectations and socioeconomic status, which comprises measures of parents' education, occupation, and family income. A strong pattern is apparent in Table 4.1 as those in the lowest SES quartile are least likely to say they are very sure of graduating and are most likely to give any of the three less hopeful responses. With each successive quartile, a greater percentage of students offers the first response while a decreasing percentage gives any of the other three responses. For the highest quartile, 93 percent say they are very sure of graduating while only 0.4 percent say they are very sure they will not graduate.

Having either siblings or close friends who have dropped out of high school is clearly associated with a student feeling uncertain of graduating. Of those tenth-grade students for whom no close friends have dropped out, 90 percent say they are very sure of graduating while only 1.0 percent say they

probably will not graduate or are very sure that they will not. In contrast, of students who have had most of their close friends drop out, only 69 percent say they are very sure of graduating while 8.4 percent give one of the two least hopeful responses.

Finally, significant differences are found in standardized test quartiles, high school program type, and school type, with those in the highest test quartile, academic high school programs[1], and Catholic or private-independent (NAIS) schools (relative to public schools) being most confident of graduating. In contrast, those in the lowest test quartile and those in public schools relative to Catholic and private-independent (NAIS) schools indicate that they are least sure of graduating.

Expectations for Completing College. Table 4.2 provides another look at students' expectations and aspirations. This table shows the percentage of tenth graders giving various responses to the question, "How far in school do you think you will get?" On average, 1990 sophomores have high expectations. Thirty-two percent expect their highest attainment to be college graduation while another 27 percent expect to receive graduate degrees. Eighteen percent plan to attend some college, but not to receive a 4-year degree while another 13 percent expect to attend vocational, trade, or business school. Finally, 10 percent expect to stop at high school graduation while 0.6 percent do not expect to finish high school.

Interestingly, postsecondary educational expectations of 1990 sophomores show a marked increase over those of 1980 sophomores. Some 41 percent of HS&B tenth graders expected to complete college, compared to over 59 percent of NELS:88 tenth graders (Rasinski, Ingels, Rock & Pollack, 1993).[2]

It is encouraging to find such high expectations. Nevertheless, these student responses contrast sharply with what one might reasonably expect this cohort to realize, in light of college graduation rates.

[1]Students who do not know their high school program type have been chosen as an analytic category. Because a considerable portion of students fall into this category (weighted percentage for all students [that is, including non-sophomores] in the 1990 sample=7.3 percent) and the category proves repeatedly to stand apart from others. There are at least two important reasons for retaining the classification: (1) at least some high schools do not explicitly differentiate their students by program type, so that this is the most accurate response for some students to give; (2) the fact of students reporting that they do not know their program types supports the argument that some students lack adequate guidance or do not have a clear conception of the educational path they are following.

[2]Some 23 percent of tenth graders in HS&B reported that their highest educational expectation was college completion; some 18 percent indicated that they expected to earn a postgraduate degree. In contrast, 32 percent of NELS:88 sophomores gave college completion as their highest educational expectation, and 27 percent listed a postgraduate degree as their highest expectation.

TABLE 4.2. Percentage of 10th grade students giving various responses to the question "How far in school do you think you will get?"

	Less than high school graduation	High school graduation	Vocational, trade, or business school	Some college (less than 4 yr. degree)	College graduation	Graduate degree
TOTAL	0.6	9.6	12.5	17.9	32.0	27.4
GENDER						
Male	0.7	10.3	14.6	18.0	32.6	23.9
Female	0.5	8.8	10.5	17.8	31.4	31.0
RACE/ETHNICITY						
Asian/Pacific Islander	1.0	7.1	9.7	12.9	31.0	38.2
Hispanic	0.9	13.4	13.6	25.6	25.2	21.4
Black	1.1	10.0	12.1	18.1	28.2	30.5
White	0.5	8.9	12.6	16.9	33.8	27.4
American Indian	0.9	17.9	16.1	26.9	21.8	16.5
PARENTS' EDUCATION						
Did not finish H.S.	2.1	25.5	17.5	21.7	20.8	12.5
H.S. Graduate or GED	0.6	15.9	18.1	22.6	26.4	16.5
Some college	0.5	7.7	14.2	19.2	33.2	25.3
College graduate	0.0	2.9	5.0	12.2	42.9	37.1
Graduate degree	0.5	1.5	3.4	8.4	33.5	52.8
SES QUARTILE						
Lowest quartile	1.3	21.0	19.9	22.4	20.6	14.9
25-49%	0.7	11.6	17.3	20.1	30.2	20.0
50-74%	0.2	5.9	10.9	19.7	36.3	27.0
Highest quartile	0.3	1.4	3.5	9.5	38.9	46.4

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

TABLE 4.2. Percentage of 10th grade students giving various responses to the question "How far in school do you think you will get?" (continued)

	Less than High school graduation	High school graduation	Vocational, trade or business school	Some college (less than 4 yr. degree)	College graduation	Graduate degree
TYPE OF JOB R EXPECTS TO HAVE AT AGE 30						
Profes/Teacher/Techn[c]	0.1	3.5	6.2	14.7	35.9	39.6
Sales/Service/Clerical[d]	1.1	14.1	28.9	20.6	23.4	11.9
Military/Protective Serv[e]	1.3	14.9	20.2	23.9	28.6	11.0
Labor/Operative[f]	2.9	22.5	42.3	13.2	11.7	7.4
Homemaker/Not plan to work[g]	2.1	29.4	23.2	20.1	19.9	5.4
Other	0.4	9.9	9.6	22.9	35.8	21.6
Don't know	1.3	20.2	11.7	23.3	30.8	12.6
TEST QUARTILE						
Lowest quartile	1.6	19.8	21.4	25.0	19.8	12.5
25-49%	0.5	11.3	17.1	23.5	30.5	17.1
50-74%	0.1	5.2	10.3	16.5	38.3	29.6
Highest quartile	0.1	1.5	3.1	7.8	38.3	49.1
HIGH SCHOOL PROGRAM						
Academic	0.7	11.2	14.7	20.5	31.4	21.6
General	0.1	1.9	3.8	11.1	39.3	43.8
Vocational/Technical	0.8	15.9	27.9	21.6	21.1	12.7
Other	1.0	12.8	15.8	23.4	24.9	22.0
Don't know	1.9	23.9	15.0	23.6	23.9	11.6
SCHOOL TYPE						
Public	0.6	10.3	13.5	18.7	31.4	25.6
Catholic	0.4	2.8	2.8	9.5	42.1	42.5
NAIS	0.0	0.1	0.1	5.5	25.8	68.4
Other Private	0.0	6.0	3.0	11.2	41.2	38.5

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

[c]includes responses Manager/Administrator, Professional (I), Professional (II), School Teacher, and Technical.

[d]includes responses Service, Sales, Proprietor/Owner, Farmer/Farm Manager, Craftsman, Clerical.

[e]includes responses Military and Protective Service.

[f]includes responses Laborer and Operative.

[g]includes responses Homemaker/Housewife Only and Not Planning to Work.

As recently as 1988, only 23 percent of people between the ages of 25 and 29 had completed 4 or more years or college (U.S Bureau of the Census, 1990). The comparable figure for the NELS:88 cohort may prove to be somewhat higher, but it is almost certain that not all of the 59.4 percent who say they will complete 4 or more years of college will do so. As the next waves of NELS:88 data become available, it will be interesting to see if and when expectations change and what effect this may have on students' general attitudes and outlooks.

There is also perhaps some discrepancy between sophomores' high college-going expectations and the programs in which sophomores report themselves to be enrolled. While around 78 percent of sophomores expect to at least attend college, and nearly 60 percent of 1990 sophomores expect to graduate from college, only 41 percent consider themselves to be enrolled in the academic/college preparatory curriculum (as contrasted to a general or vocational curriculum).[8] This same lack of articulation between expectations for college-going and preparation for college was observed in the eighth grade cohort in 1988. Although two thirds of 1988 eighth graders felt sure they would graduate from college, only 29 percent planned to enroll in the college preparatory curriculum and fully 25 percent reported that they did not know what type of high school program they would enroll in (Hafner, Ingels, Schneider, & Stevenson, 1990, Figure 4.2, p.65).

Gender differences in postsecondary expectations. From the figures given in Table 4.2 for various subgroups, it can be seen that roughly the same proportions of males and females report that college graduation will be their highest educational attainment. However, the proportion of tenth-grade females planning to receive a graduate degree (31 percent) is significantly higher than the proportion of tenth-grade males with such plans (23 percent).

Racial/ethnic differences in postsecondary expectations. The table suggests some notable differences among racial and ethnic groups. Summing the last two columns reveals that Hispanics and American Indians are the groups least likely to report plans for college graduation or graduate school (47 percent and 38 percent, respectively). In both cases, these percentages are significantly lower than the figures for Asians (69 percent), whites (61 percent), and blacks (59 percent).

Parents' Education/Socioeconomic Status. Focusing on the opposite extreme of educational expectations, we can sum the first two columns of the table to see the percentage of 1990 sophomores who expect to leave high school before graduation or who expect to have high school graduation as their highest level of attainment. Here the influences of parents' educational level and socioeconomic status are clearly in evidence. Of students whose parents did not complete high school, 28 percent are concentrated in the first two columns of Table 4.2. In contrast, only 2 percent of the students whose parents attended graduate school are located in the first two columns of the table. More generally, the proportion of students expecting to end their education with high school graduation or less drops significantly with each successive category of parents' education (except that there is no significant difference between sophomores whose parents' highest level was college graduation and students whose parents attended graduate school).

Similar results are found according to socioeconomic status. That is, of those tenth-grade students in the lowest SES quartile, 22 percent are concentrated in the first two columns of the table while, of those in the highest SES quartile, only 2 percent are located in the first two columns. Also, once again, the proportion located in these two columns drops significantly with each successive quartile.

[8]Full statistics on 1990 student-reported program placement may be found in Rasinski, Ingels, Rock and Pollack, 1993.

As expected in light of the results reported above, the proportion of sophomores planning to finish college or to attend graduate school increases significantly with each successive category of parents' education and socioeconomic status (except that, once again, there is no significant difference between students in the last two rows of parents' education level).

Occupational and educational expectations. Table 4.2 also shows sophomores' educational expectations according to the type of job each expects to have at age 30. It is difficult to group the job categories in a way that makes detailed analyses possible, but there appears to be a general trend by which tenth graders aspiring to jobs which require high degrees of education or specialized training plan to continue with their schooling accordingly. For example, the job category which includes manager, administrator, various professional-level occupations, school teacher, and technical specialist is probably the category requiring the most education. Consistent with this fact, the students expecting to work in these fields are the ones most likely to aspire to college graduation or graduate school (76 percent). Furthermore, 1990 sophomores expecting to work as laborers/operatives and sales/service/clerical persons are more likely than sophomores expecting to work in other occupations, with the exception of sophomores planning to enter the military or planning to be homemakers, to anticipate their educational careers extending beyond high school to vocational, trade, or business school. This, too, seems to show generally congruent educational and occupational goals.

Other factors. Finally, the table reveals significant differences in student expectations on the basis of test quartile, high school program type, and school type. Consistent with the figures from Table 4.1, sophomores in the highest test quartile, academic high school program, and private schools regardless of type most often report plans for college graduation or graduate school. In contrast, the tenth graders most often reporting plans to complete high school or less as their highest attainment are those in the lowest test quartile, those who do not know their high school program type, and those from public schools.

4.2 STEPS TOWARD COLLEGE: COLLEGE ENTRANCE EXAMINATIONS

Tables 4.1 and 4.2 report the levels of schooling tenth graders expect to attain. The data of NELS:88 allows us to probe further and to examine the thoughts and efforts sophomores and their families have put toward actually achieving their goals. Base year questions asked parents if they had begun to save money for their children's post-high-school education. For students who are planning to go to college, NELS:88 first follow-up questions ask about the importance of college expenses, course offerings, and social life in choosing a college. These questions reveal something about the amount of thought that has been given to college and about student perceptions of what is important in college life.

The first follow-up questionnaire also asks sophomores whether they have taken or are planning to take some of the standard college entrance exams. This information, again, is telling of the amount of thought that has been given to college and of an awareness of some basic requisite steps. Table 4.3 shows the percentage of 1990 tenth graders giving various responses to questions about the PSAT, SAT, and ACT. Regarding the PSAT, 56 percent say they have taken the test or plan to take it; 8 percent say they do not plan to take it; and 36 percent say they have not thought about it. For the SAT, the percentages are 61 percent, 7 percent, and 32 percent, respectively. For the ACT, the percentages are 40 percent, 10 percent, and 50 percent.

In considering differences among various subgroups in Table 4.3, discussion here will be limited to responses about the SAT. However, virtually all trends reported for the SAT hold true for responses about the PSAT and the ACT, with variation only in magnitude.[9] Not surprisingly, the table shows that there is a strong positive association between having plans to take the SAT and (a) educational aspirations, (b) types of courses taken in high school, and (c) confidence in graduating from high school.

The trends associated with educational aspirations are similar to the trends associated with the likelihood of graduating. Of those who expect to end their schooling with high school graduation, 16 percent plan to take the SAT (one may wonder why they have these plans), 26 percent do not plan to take it, and 58 percent have not thought about it. In contrast, of those who plan to receive graduate degrees, 84 percent plan to take the test, 2 percent do not plan to take it, and 14 percent have not thought about it. Regarding the association between certainty of graduating from high school and plans for the SAT, students who are very certain they will graduate from high school are three times more likely (65.5%) to have plans to take the SAT than students who report they probably will not graduate from high school (21.9%).

Not surprisingly, 1990 sophomores who have taken advanced math and advanced science in ninth and tenth grade are much more likely than others to have plans to take the test and are much less likely to say they have not thought about it. Note that many of the students not in advanced placement courses or advanced math and science do report plans to attend college; thus, the large proportion who are seemingly unaware of the importance of entrance exams is troubling.

[9]It should be noted that the SAT and ACT serve similar functions in the college entrance process. Many students take one examination or the other. In light of this, some analysts may choose to include the SAT and ACT in a single category and examine student plans to take at least one of the tests.

TABLE 4.3. Percentage of 10th grade students giving various responses to the question "Have you taken or are you planning to take any of the following tests in the next two years?"

	Pre-SAT			SAT			ACT		
	Haven't thought about it	No, don't plan to take it	Yes, this year, next, or 12 gr	Haven't thought about it	No, don't plan to take it	Yes, this year, next, or 12 gr.	Haven't thought about it	No, don't plan to take it	Yes, this year, next, or 12 gr.
TOTAL	36.1	8.4	55.5	32.2	6.8	61.0	50.0	10.0	40.1
HOW SURE OF GRADUATING FROM H.S.?									
Very sure of grad	33.1	7.8	59.1	29.0	5.5	65.5	47.9	9.0	43.1
Probably grad	56.6	11.6	31.8	55.7	13.6	30.7	65.0	15.6	19.4
Probably not grad	64.3	16.9	18.8	52.4	25.7	21.9	53.4	22.4	24.3
EDUCATIONAL ASPIRATIONS									
Less than H.S.	59.2	27.3	13.5	51.2	39.5	9.3	50.1	36.5	13.4
H.S. graduation	60.1	20.9	18.9	58.1	26.3	15.6	62.2	29.4	8.5
Voc, trade or business school	62.0	12.4	25.6	61.7	13.0	25.3	65.2	17.2	17.6
Some college	47.0	8.1	44.9	43.9	6.2	50.0	57.4	7.3	35.3
College graduation	27.2	5.9	66.9	23.4	2.4	74.2	47.5	6.1	46.4
Graduate degree	19.5	5.2	75.4	13.5	2.3	84.2	37.4	6.1	56.5
EVER BEEN IN ADVANCED PLACEMENT PROGRAM									
Yes	21.0	5.4	73.7	16.0	2.4	81.6	42.3	7.3	50.4
No	42.1	9.5	48.4	38.7	8.3	53.0	53.0	11.1	35.9
MATH IN GRADE 9 AND 10									
Advanced	22.2	6.0	71.8	17.2	2.9	79.9	44.4	8.1	47.5
Middle	34.1	6.9	59.0	30.4	4.7	65.0	48.0	7.9	44.1
Low	54.2	13.8	32.0	51.6	15.0	33.4	60.0	16.3	24.2
SCIENCE IN GRADE 9 AND 10									
Advanced	20.5	5.4	74.1	18.0	3.1	78.9	42.4	9.6	47.9
Middle	38.2	8.5	53.3	33.8	6.7	59.5	50.7	9.8	39.6
Low	50.3	14.4	35.3	50.9	16.5	32.6	60.2	13.5	26.4

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

TABLE 4.3. Percentage of 10th grade students giving various responses to the question "Have you taken or are you planning to take any of the following tests in the next two years?" (continued)

	Pre-SAT			SAT			ACT		
	Haven't thought about it	No, don't plan to take it	Yes, this year, next, or 12 gr	Haven't thought about it	No, don't plan to take it	Yes, this year, next, or 12 gr.	Haven't thought about it	No, don't plan to take it	Yes, this year, next, or 12 gr.
TEST QUARTILE									
Lowest quartile	50.4	12.4	37.2	49.3	15.0	35.8	54.2	14.7	31.2
25-49%	42.6	9.5	47.9	41.3	8.8	49.9	53.1	11.6	35.3
50-74%	34.7	6.9	58.5	28.7	3.4	67.9	49.9	7.5	42.6
Highest quartile	19.9	5.6	74.7	13.7	1.8	84.5	42.5	7.0	50.5
HIGH SCHOOL PROGRAM									
General	42.0	8.9	49.1	38.5	7.4	54.0	52.3	9.4	38.3
Academic	19.6	5.7	74.8	14.2	2.3	83.5	42.8	7.7	49.6
Vocational/Technical	50.4	11.0	38.7	45.6	13.3	41.1	56.2	14.1	29.6
Other	43.8	9.5	46.7	44.3	8.7	47.0	56.7	10.6	32.7
Don't know	54.9	13.9	31.2	53.0	13.8	33.2	58.6	14.8	26.5
SCHOOL TYPE									
Public	37.9	8.8	53.3	33.9	7.1	59.0	50.2	9.9	39.9
Catholic	20.6	3.6	75.8	16.5	3.4	80.2	45.6	6.7	47.7
NAIS	23.4	2.5	74.0	18.9	0.3	80.8	58.4	9.0	32.6
Other Private	16.8	5.2	78.1	11.3	5.5	83.2	31.9	11.0	48.3

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Finally, there are significant differences according to standardized test quartile, high school program type, and school type. The students most likely to have plans to take the SAT are those in the highest test quartile, academic high school programs, and private sector schools. These same students are the ones least likely to say they do not plan to take the test or to say they have not thought about it. In contrast, the students least likely to have plans to take the test and most likely to say they do not plan to take it or they have not thought about it are those in the lowest test quartile, those who say they do not know their high school program type, and those in public schools.

4.3 GUIDANCE AND INFLUENCE: THE IMPACT OF COUNSELORS AND MOTHERS

Analyses of the base year data for 1988 eighth graders suggested that at the point of transition into high school, contact with guidance counselors was quite limited, and there was considerable uncertainty or mismatch for many students between their expectations and their educational plans. The following findings (Hafner, Ingels, Schneider & Stevenson, 1990) illustrate these points:

- Some 64 percent of eighth graders reported that they never discussed high school programs with their counselors; 30 percent said they had done so once or twice; 6 percent had done so three or more times;

- Eighth graders were far more likely to have discussed their high school plans frequently (that is, three or more times) with their mothers (52 percent) or fathers (31 percent) than with such school personnel as their teachers (8 percent) or their counselors (6 percent);

- Although two thirds of 1988 eighth graders indicated that they plan to finish college or go on to graduate or professional school, only about a third indicated that they planned to enroll in a college preparatory program in high school;

- A quarter of spring-term 1988 eighth graders indicated that they did not know what high school program they would enter.

In light of such findings for 1988's eighth graders it is very much of interest to examine the situation of 1990's sophomore class, to see if, once in high school, the process of guidance and influence differs, and the match between expectations and preparation becomes closer.

We have seen that there is considerable variation in what tenth graders plan to do after high school. There also seem to be gaps in information flow and guidance for some students. Both of these facts are likely to be related to the interactions sophomores have with adults at school and at home. Table 4.4, Figure 4.1, and Figure 4.2 look at various aspects of the guidance and influence tenth graders receive from their school counselors and their mothers.

Counselor Recommendations. Table 4.4 shows percentages of tenth graders giving various responses to the question, "What does your school counselor think is the most important thing for you to do right after high school?" The majority of sophomores (60 percent) say their counselors would have them go to college. The second most frequent response (26 percent) is that the students do not know what their counselors would have them do. These two responses are followed by "The counselor thinks I should do what I want" (7.5 percent), "They don't care" (3.2 percent), "Enter a trade school or apprenticeship program" (2.0 percent), "Get a full-time job" (0.9 percent), and "Enter military service" (0.7 percent). It must be realized that these responses may in some instances reflect tenth graders' desires

or expectations more than they reflect their counselors' advice, but some important inferences can be made, nonetheless.

Few significant differences appear in the table by race/ethnicity or gender. By socioeconomic quartile, however, a strong association is evident between SES level and the likelihood of reporting that one's counselor would advise college attendance. Among those in the lowest SES quartile, 52 percent say their counselors think college is the most important step for them after high school. In contrast, 72 percent of those in the highest SES quartile give this response. The difference of 20 percent between the low and high SES groups cited above is not accounted for by any single category in Table 4.4. A significant portion of the difference, however, is found in the last column of the table. That is, the proportion of sophomores from the lowest SES quartile reporting that they do not know what their counselors would have them do (30 percent) is 11 percentage points higher than the proportion of sophomores from the highest quartile who give this response (19 percent).

TABLE 4.4. Percentage of 10th grade student giving various responses to the question "What does your school counselor think is the most important thing for you to do right after high school?"

	Go to College	Get a full-time job	Enter a trade school or apprenticeship program	Enter military Services	They think I should do what I want	They don't care	I don't know
TOTAL	60.3	0.9	2.0	0.7	7.5	3.2	25.5
GENDER							
Male	59.2	1.1	2.6	1.0	7.6	3.3	25.3
Female	61.4	0.7	1.3	0.3	7.3	3.2	25.8
RACE/ETHNICITY							
Asian/Pacific Islander	63.7	0.8	1.2	0.4	7.2	3.2	23.6
Hispanic	60.6	0.4	2.5	0.4	7.1	3.8	25.4
Black	63.2	1.3	2.3	1.7	4.5	2.1	24.9
White	59.8	0.7	1.9	0.5	8.0	3.4	25.7
American Indian	48.2	11.3	2.8	1.0	8.1	1.5	27.2
SES QUARTILE							
Lowest quartile	51.7	2.3	2.7	1.1	7.7	4.2	30.4
25-49%	54.7	1.0	2.5	1.2	8.3	3.7	28.7
50-74%	61.6	0.5	1.7	0.3	6.9	2.9	26.1
Highest quartile	71.6	0.1	0.7	0.2	6.3	2.3	18.9
TEST QUARTILE							
Lowest quartile	51.2	3.0	4.3	1.3	9.3	4.1	26.7
25-49%	56.1	0.9	2.2	0.8	8.2	3.0	28.8
50-74%	61.4	0.1	1.5	0.5	7.2	3.0	26.2
Highest quartile	70.0	0.0	0.2	0.1	6.0	2.1	21.6

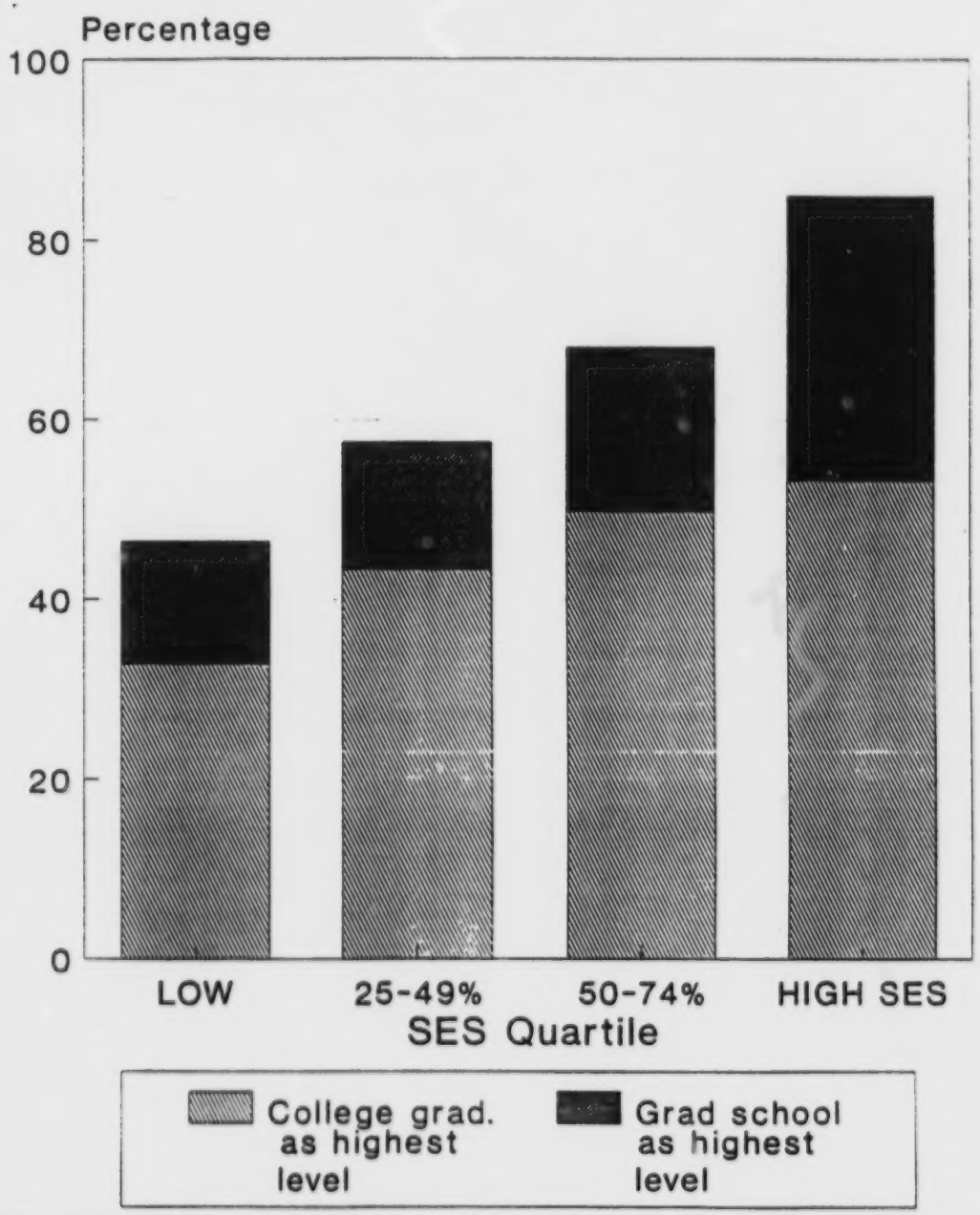
Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

TABLE 4.4. Percentage of 10th grade student giving various responses to the question "What does your school counselor think is the most important thing for you to do right after high school?" (continued)

	Go to College	Get a full-time job	Enter a trade school or apprenticeship program	Enter military Services	They think I should do what I want	They don't care	I don't know
HIGH SCHOOL PROGRAM							
General	55.2	0.7	2.4	0.7	7.9	3.6	29.5
Academic	73.5	0.3	0.6	0.2	6.7	2.1	16.6
Vocational/Technical	51.2	2.4	4.9	1.5	8.3	3.5	28.2
Other	54.2	0.7	2.3	1.0	7.6	5.3	28.9
Don't Know	43.7	2.6	1.6	1.2	7.0	5.0	38.9
SCHOOL TYPE							
Public	58.7	1.0	2.1	0.7	7.6	3.4	26.6
Catholic	75.3	0.4	0.6	0.0	6.8	1.7	15.2
NAIS	67.2	0.3	1.5	0.6	4.8	0.6	25.0
Other Private	78.2	0.0	1.5	0.0	8.3	0.6	11.4

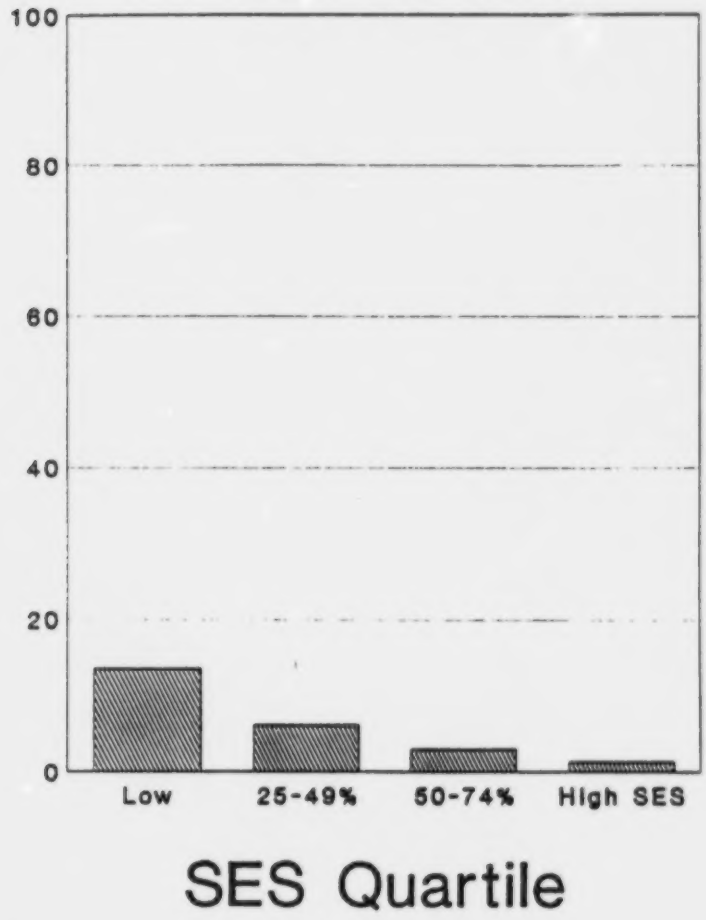
Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.1.a. Percentage of tenth graders who say their mothers would want them to complete college or graduate school as highest education level by socioeconomic quartile.



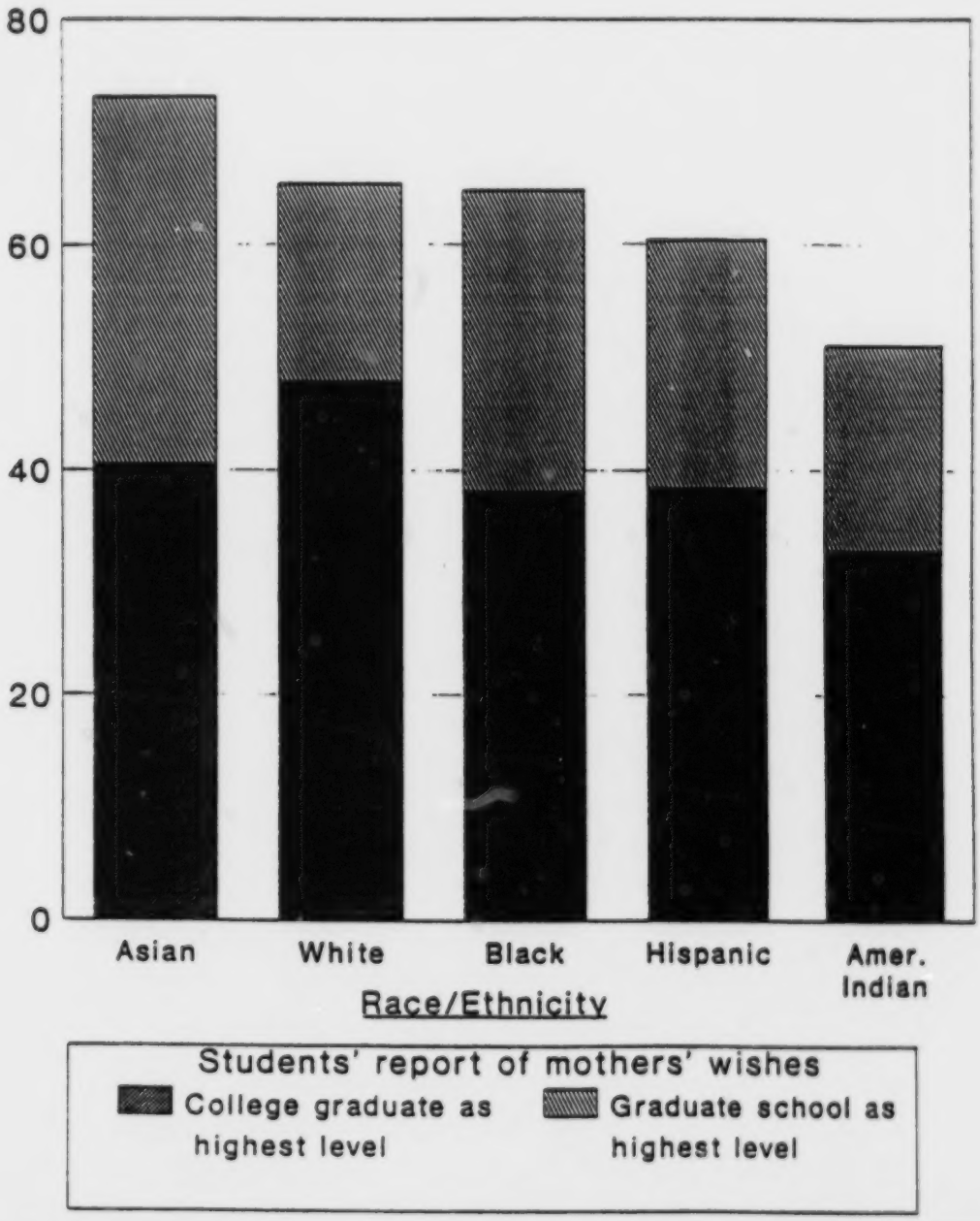
Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.1.b. Percentage of tenth graders who say their mothers would want them to complete less than high school or high school graduation as highest education level by socioeconomic quartile.



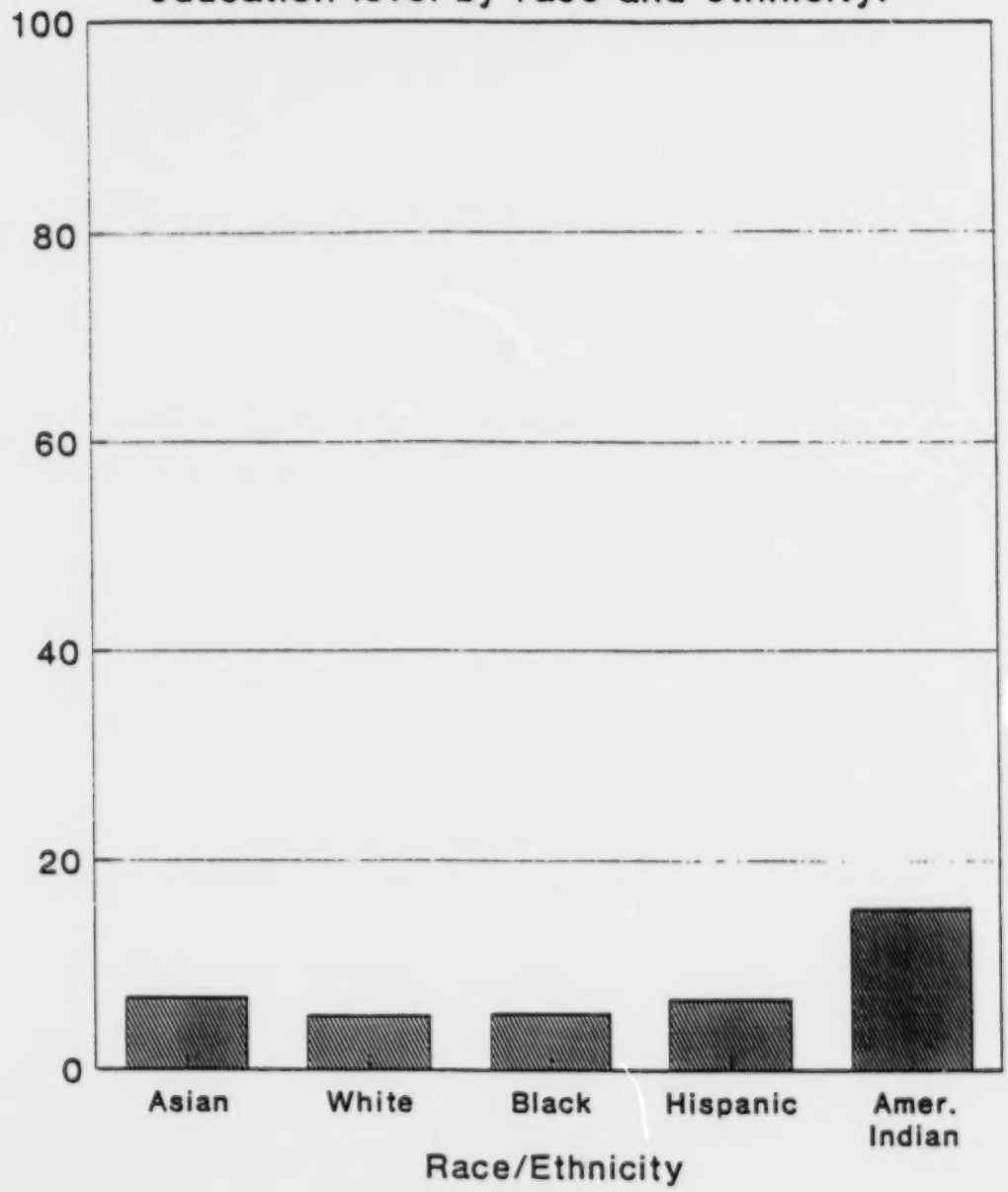
Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.2.a. Percentage of tenth graders who say their mothers would want them to complete college or graduate school as highest education level by race and ethnicity.



Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.2.b. Percentage of tenth graders who say their mothers would want them to complete less than high school or high school graduation as highest education level by race and ethnicity.



Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Students in the highest test quartile[10] are more likely than those in the lowest to indicate that their counselors advise them to go on to college. It is nonetheless striking that a majority of students even in the lowest test quartile feel that their counselors are pressing them toward college. Among sophomores from the lowest test quartile, 51 percent say their counselors would have them go to college; 27 percent say they do not know what their counselors would have them do. In contrast, 70 percent of those from the highest quartile say their counselors advise them to go to college while 22 percent say they do not know what their counselors would advise.

Table 4.4 also shows differences according to high school program type and school type. Students attending private, independent schools (NAIS) are no more likely than students attending public schools to encounter counselors who do not know what they should do right after high school. Regarding program type, students enrolled in academic programs are the least likely of students enrolled in all other types of school programs to have had their counselors tell them they do not know what they should do immediately after high school. However, it is striking that even for those placed in non-college preparatory programs, over half report that their counselors want them to continue on to college.

Nevertheless, the proportions of sophomores who report that they do not know what their counselors would recommend they do is disturbingly high. Table 4.4 highlights certain groups of sophomores--specifically, those in the lowest SES quartile and those in the lowest test quartile (as well as those in non-academic high school programs)--whose reports suggest that they may be passing through their high school years with less sense of direction from school guidance counselors than may be imparted to high-SES and high-achievement sophomores.

Mother's Aspirations. Figures 4.1 and 4.2 are based on sophomore reports of how far their mothers would want them to go in school.[11] Specifically, Figure 4.1a shows the percentage of tenth graders who say their mothers would want them to complete college or attend graduate school as their highest education level, by socioeconomic quartile. There is a clear association between SES and reports of mothers' wishes. Among students in the lowest SES quartile, 33 percent said their mothers would have them finish college while an additional 14 percent said their mothers would want them to attend graduate school. In contrast, 53 percent of the students in the highest quartile said their mothers would have them finish college and an additional 31 percent said their mothers would want them to pursue graduate studies. Percentages for the two middle quartiles fall between those of the low and high quartiles revealing a unidirectional trend in the association between SES and student reports of mothers' wishes, as can be seen in the figure.

Figure 4.1b illustrates the opposite extreme of tenth-grader reports of mothers' wishes. The figure shows the percentage of students who say their mothers would want them to complete less than high school or graduate from high school as their highest education level, again by socioeconomic quartile. While all of the proportions are quite small, one can see that students in the lowest SES quartile are most likely to give these responses; with each successive quartile, the percentage giving these responses decreases.

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[10]The test quartile referred to here is based on the tenth grade composite (math and reading score) on the cognitive test battery.

[11]For an analysis drawn from NELS:88 base year data of the relationship between race, gender, and socioeconomic status, on the one hand--and, on the other, student postsecondary expectations, student perceptions of their mother's postsecondary aspirations for them, and parents' postsecondary expectations for their eighth graders--see Solorzano (1992).

Figures 4.2a and 4.2b show sophomore reports of mothers' wishes, by race and ethnicity. With but two exceptions,[12] there are no significant differences among the racial/ethnic categories, which is noteworthy. Another noteworthy point is found when Figures 4.2a and 4.2b are compared with Table 4.2. When reports of tenth-grade students' own expectations and student reports of mothers' wishes are each crosstabulated by various demographic and background variables, students' expectations and mothers' wishes generally prove to be very similar.[13] This is the case, for example, when each item is crosstabulated by SES quartile (see Table 4.2 and Figure 4.1). However, when sophomores' expectations and mothers' wishes are each crosstabulated by race and ethnicity, one sees that the two resulting distributions differ from one another in important ways.

Table 4.2 showed that Hispanic students expected to graduate from college or attend graduate school significantly less often than did Asians, blacks, or whites (Hispanics vs. Asians, whites, blacks, respectively). Figure 4.2a, however, shows Hispanic students reporting that their mothers have these high hopes or aspirations at rates not significantly different from those of blacks or whites. Hispanics are significantly less likely than Asians to report that their mothers have these high hopes, but the size of the gap is smaller here than it was in Table 4.2. These facts raise interesting questions about the social contexts that lead some tenth graders to have personal expectations very much in line with the expectations their mothers have for them while other students have personal expectations which are below those their mothers hold for them. Given that mothers' expectations align quite closely across groups, such variation among student expectations is an intriguing phenomenon.

It is possible to invoke some measure of historical perspective on the postsecondary expectations of 1990 high school sophomores, by comparing the advice about college-going received by sophomores in 1990 with the expectations, and advice received, by high school sophomores in 1980. In a report comparing HS&B and NELS:88 results, Rasinski, Ingels, Rock and Pollack (1993) draw the following comparisons between the two cohorts:

- 1990 sophomores are significantly more likely than 1980 sophomores to say they will go on to complete a bachelor's or advanced degree. Among 1990 sophomores, 59 percent say that they will complete a bachelor's degree or higher; among 1980 sophomores, 41 percent had this expectation. These heightened expectations hold across all SES groups and for Hispanics, blacks, and whites;

- Members of the 1990 sophomore cohort are more likely to say they will attend a postsecondary institution right after high school, with no delays; 60 percent of 1990 sophomores plan immediate entry, as contrasted to 49 percent of their counterparts from a decade before;

- 1990 sophomores reported receiving significantly more adult advice urging them to attend college after high school than did 1980 sophomores. Fathers, mothers, guidance counselors and teachers in 1990 were all consistently more likely to recommend college attendance. Specifically:

[12]The two significant contrasts for college and graduate school are Asian and Hispanic and Asian and American Indian.

[13]The difference between expectations and aspirations should of course be kept in mind. Students were asked "how far in school do you think you will get" and they were asked how far in school they thought their mother wanted them to go.

- 77 percent of 1990 sophomores reported that their fathers recommended they go to college; 59 percent of 1980 sophomores reported this recommendation;

- 83 percent of 1990 sophomores indicated that their mothers recommended they go to college; the figure in 1980 was 65 percent

- 65 percent of 1990 sophomores reported that their guidance counselor urged them to attend college after high school, as contrasted to 32 percent for 1980 sophomores; and

- 66 percent of 1990 sophomores reported that their teachers recommended attending college, compared to 32 percent for 1980 sophomores.

It is interesting to learn what America's high school sophomores hope to accomplish or think they will accomplish. There is considerable variation in the responses of different types of tenth graders. Accompanying this variation, and likely explaining much of it, is variation in the guidance and advice students have received in their schools and in their homes. In addition to providing educational outcome data that will permit measurement of the degree to which these expectations and aspirations in fact are realized, future waves of NELS:88 data will illuminate the manner in which student expectations change over time, the long-term implications of differences in school and family environments, and changes in outlooks and attitudes as students come to realize they may achieve either more or less than they might have imagined as eighth and tenth graders.

CHAPTER 5: CONCLUSIONS

Many points might be commented upon by way of conclusion. However, five topics seem especially noteworthy:

- **Instructional Practices: Status of The New Mathematics Reforms**
- **Gender Differences in Tested Sophomore Achievement in Math**
- **Socioeconomic Status Differences in Mathematics Achievement, Expectations, and Decision-Making**
- **Racial/Ethnic Differences in Postsecondary Educational Expectations, Course Taking, and Achievement in Mathematics**
- **Sophomores' Preparation for the Transition to College or Work**

Each of these five themes will be addressed in turn.

5.1 The New Mathematics Reforms: Instructional Practices.

What students should know has been a focal question of recent school reforms. Inextricably bound up with the question of desirable knowledge is the further question of how best to convey it. Written national subject-matter standards for content (and, to a greater or lesser extent, instruction) are being developed in a number of disciplines, including science, English, foreign languages, social studies, history, geography, civics, and the arts. Most of these standards documents are slated for publication in 1994. However, for mathematics, national curriculum and evaluation standards for a technology-sensitive, problem-solving approach to the subject were published in 1989, supplemented by the publication of mathematics teaching standards in 1991.

Instruction is a major "alterable" variable in education. Instructional methods can be changed, and improved instructional techniques can bring about higher achievement. In the light of development by the National Council of Teachers of Mathematics (NCTM) of these new standards for mathematics curriculum and instruction, we asked about classroom practices--specifically, to what degree are the NCTM-recommended resources and activities employed in the tenth-grade mathematics classroom? Further, we asked about equity--namely, are there group differences in exposure to recommended classroom practices?

Two generalizations may, with slight qualifications, be drawn from the data analyzed in this report. First, and unsurprisingly, the new mathematics reforms were not yet dominant in the classrooms of American sophomores in 1990. Second, to the extent that the recommended curricular practices and resource utilizations were present, some differential exposure favoring higher SES sophomores was observed in two of four examined practices (calculator use and teacher demand for student oral explanation in the math classroom). Both generalizations can be supported with specific data.

Extent of recommended practices. The new standards stress *problem solving activities*, yet only 30 percent of sophomores engage in problem-solving activities often--though more than 80 percent do so at least sometimes. The new standards emphasize *student discussion and oral explanation*. Some 41

percent of sophomores report they never participate in student-led discussions in math class, and 39 percent of sophomores report that they never explain their work to the class orally.

Additionally, the new standards make a number of recommendations concerning *resources*. Specifically, use of books other than math texts and hands-on material, computers and calculators are prescribed in the new math guidelines. However, seventy percent of American sophomores report that they never use books in math class other than math texts. Fully 69 percent report never using hands-on material, and only 6 percent do so often. Some 84 percent of 1990 sophomores report never using computers. Just over a third report that they use calculators in class frequently, and another 38 percent indicate that they sometimes use calculators.

Equitable distribution of recommended practices. One question the NELS:88 data are particularly suited for addressing is whether the likelihood of exposure to instructional and/or classroom practices and resources varies by student subgroups, such as racial, gender, or socioeconomic group. While the overall picture is mixed, we saw some evidence that for the more widespread or common practice -- student oral explanation in math class and use of calculators -- high-SES sophomores are somewhat more likely to be exposed. For example, 40 percent of sophomores in the highest SES quartile report frequent calculator use, compared to 30 percent in the lowest quartile. However, in terms of the other two recommended (and currently less widespread) practices examined in this report, high-SES sophomores are not more likely (and in some cases are less likely) to be exposed to books other than a math text or hands-on material in math class. It will be important to continue to monitor issues of equity in distribution and access as the new mathematics standards are more widely implemented.

5.2 Gender Differences in Tested Sophomore Achievement in Mathematics

There are multiple reasons for being concerned with gender differences in achievement. Ultimately, most of these reasons reflect concerns with individual equity and national economic efficiency. Though different patterns appear at different ages, in general, NAEP results have shown a female advantage in reading and a male advantage (especially at age 17) in mathematics, science, and social studies (Mullis, Owen & Phillips, 1990). While all of these differences are cause for concern, gender differences in science and math course-taking and achievement, and in the choice of science and engineering careers, have been a special concern. Women and minority groups are considerably underrepresented among scientists, science teachers, and engineers, and are being lost from the "science pipeline" at a time when the nation forecasts a shortfall of scientists and engineers in coming years (National Research Council, 1990).[1] In turn, many recent reform efforts have been aimed at encouraging the participation and performance of females in the science and math curriculum. Quite apart from considerations of national economic efficiency (that is, supplying needed numbers of future scientists, mathematicians and engineers), the advantages of advanced numeracy, literacy and of civic education are goods that one may reasonably wish to see shared equally by all, regardless of gender. The NELS:88 dataset provides many opportunities for studying the differences in classroom experience of males and females across the four subject matters in which sample members were tested, and the influence of family factors, prior values and aspirations, and other factors on gender differences in course taking and achievement. The objective of this report, however, is the more modest one of cataloguing and pointing to such differences to the degree that they were present for American sophomores in 1990.

[1]Schmieder and Michael-Dyer estimate that, given current demographic trends, 85 percent of the shortage of scientists must be filled by women and underrepresented minorities.

Different patterns of results may be discerned across the different subject matters. Here, however, we discuss mathematics achievement only. For *mathematics*, we noted that at eighth grade, there were no significant gender differences in achievement in 1988. This report on 1990 sophomores shows a small male advantage in the highest test quartile; all other differences by quartile were nonsignificant. When looked at in terms of mathematics proficiency scores, this report shows that males were more likely than females to have mastered complex problem-solving skills; otherwise gender differences in sophomore mathematics achievement were not statistically significant. In terms of mathematics coursework, males and females were equally as likely to have taken geometry or an advanced math sequence by the spring of the sophomore year. Longitudinal analyses of NELS:88 data show that there were no significant differences among males and females with respect to overall gains from 1988 to 1990 in mathematics, nor were there differences in the proficiency levels at which gains were found (Scott, Rock, Pollack & Ingels, 1993). Comparison of 1980 sophomores with 1990 sophomores shows higher mathematics achievement for 1990 males and females, and that the amount of gain was the same for both males and females (Rasinski, Ingels, Rock & Pollack, 1993). It will be enormously of interest to examine the 1992 NELS:88 twelfth-grade results to determine whether large gender differences have by then asserted themselves (as historically has been the case), or whether reform efforts (or other, non-school factors) have resulted in diminished differences or parity between the sexes in this area.[2]

5.3 Socioeconomic Status Differences in Math Achievement, Expectations, and Decision-Making

A pervasive theme in the educational literature is the strong influence of family background on achievement and other educational outcomes. It is important to monitor the extent of this influence for each new cohort, to determine whether social programs are succeeding in narrowing the gap between those with more and less favored family background. NELS:88 1990 data show that the disadvantage--or inequality of opportunity--suffered by low-SES sophomores when compared to their high-SES peers is indeed pronounced. This report documents the extent of the disparity between low- and high-SES students in math achievement, expectations, guidance and decision-making.

In terms of *achievement*, over four times more low-SES tenth graders than high-SES tenth graders are in the bottom math achievement quartile while four times more high-SES sophomores than low-SES sophomores are in the highest test quartile.

In terms of such hypothesized alterable precursors of achievement as *course taking*, high-SES sophomores are over twice as likely as low-SES sophomores to have completed a year of geometry (27 percent for low-SES, versus 68 percent for high-SES), and almost three times more likely to have taken a full 2 years of foreign language in ninth and tenth grade (58 percent for high SES, 17 percent for low).

In terms of *decision making and guidance*, there is some evidence that low-SES students receive less guidance from parents as well as less from school counselors than do high-SES students. For example, low-SES sophomores are significantly more likely than high-SES sophomores to make decisions about what classes they will take entirely on their own, that is, without parental input. Low-SES sophomores are also significantly more likely than high-SES sophomores to report that they do not know what their counselors would advise them to do with their futures.

Educational expectations are substantially lower for low-SES sophomores, in terms of their mothers' expectations for them and in terms of their expectations for themselves. Some 47 percent of

[2]Meta-analysis of recent studies on sex differences in mathematical performance suggests that male-female differences have been decreasing over the years (Friedman, 1989).

sophomores in the lowest SES quartile report that their mother wants them to complete college or graduate school. In contrast, 84 percent of sophomores in the highest SES quartile report that their mother wants them to complete college or graduate school. If we categorize those sophomores (some 59.4 percent of the total) who expect to complete at least a four year college degree by SES quartile, we see just over a third (35.5 percent) of those in the lowest SES quartile hold this expectation, compared to over 85 percent of those in the highest SES quartile.[3]

5.4 Race Differences in Postsecondary Educational Expectations, Course Taking, and Math Achievement

The subject of this report is American high school sophomores. Tenth graders have two more years of high school, and those who have not, for example, taken geometry, or have not given serious thought to college entrance examinations, may nevertheless do so before their high school careers are over. Data from NELS:88 seniors in 1992 will complete the picture of the high school careers of this cohort. Disparities between groups in 1990 may have widened, or narrowed, by 1992. In the meantime it is critical to note contrasts between the postsecondary expectations, course taking experience, and tested math achievement of various groups of sophomores.

We saw that educational expectations of 1990 sophomores vary significantly and systematically by socioeconomic status. If we examine educational expectations by race/ethnicity, however, the difference is not nearly so large, at least for non-Hispanic whites and blacks. For these two groups at tenth grade, future postsecondary educational expectations do not appear to be greatly dissimilar. Some 61 percent of whites and 59 percent of blacks expect to complete at least a four year college degree. More whites than blacks expect to complete just a four-year college course and not go on to professional or postgraduate work (33.8 percent of whites, 28.2 percent of blacks); black-white differences in expectation to complete a postgraduate or professional degree (30.5 percent of blacks and 27.4 percent of whites) are not statistically significant.

Viewed historically, the college expectations of both whites and blacks increased significantly between 1980 and 1990.[4] Some 41 percent of both black and white HS&B sophomores expected to complete at least a four year college degree, compared to 61 percent for whites and 59 percent for blacks a decade later. (The postsecondary expectations of Hispanics also rose, from 33 percent expecting to complete at least a four year college degree in 1980, to 54 percent of 1990 Hispanic sophomores.) Although both the high school completion rates and the postsecondary expectations of black students increased over the decade, the proportion of black students going directly on to college did not.[5]

While the gap between black-white educational expectations is small, there is a large gap in course-taking in the "college gatekeeper" courses and there is an even larger gap in tested achievement. First, let us return to the two "college gatekeeper courses" identified by Pelavin and Kane in their analysis of the HS&B data.

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[3] Lowest SES Quartile: 35.5%; Second Quartile: 50.2%; Third Quartile: 63.3%; Highest Quartile: 85.3%.

[4] These HS&B-NELS:88 comparisons are drawn from Rasinski, Ingels, Rock and Pollack, 1993.

[5] *The Condition of Education, 1994*, indicates that "the percentage of blacks enrolling in college in the fall following high school graduation was 47 percent in 1991, about the same as it was in 1978" (though blacks are somewhat more likely than whites to enroll after a delay). For a detailed dissection of the sometimes complex trends in minority postsecondary enrollment in recent years, see Koretz, 1990. For a comprehensive summary of educational differences between blacks and whites from preschool to labor force entry, see *The Condition of Education, 1994*, pp. 9-14.

Pelavin and Kane report, employing data from the HS&B 1980 sophomore cohort, that the best course-taking predictors of college attendance are geometry and foreign language. Apparently, 1982 high school graduates with a year or more of geometry were twice as likely to attend college as those who lacked this background. Pelavin and Kane indicate that though blacks and Hispanics are less likely than whites to have completed a year of geometry (40 percent of whites, 19 percent of blacks, and 17 percent of Hispanics had done so), "there is no discernible difference between the college attendance rates of minorities [blacks and Hispanics] and whites among the students who take geometry courses" and that "taking geometry is associated with a reduced gap between the college attendance rates of blacks and whites, and Hispanics and whites" (p.48). They also report that geometry-taking is associated with a similar reduction in the college attendance gap between high and low income groups (p.48).

For foreign language-taking, about twice as many whites as blacks in the graduating class of 1982 had completed at least two years of foreign language (29 percent versus 15 percent). However, students with this academic background were twice as likely to attend college within four years of graduation (86 percent versus 44 percent), While this sequence was associated with a higher likelihood of college attendance for all races, Pelavin and Kane (1990, p.53) report the following racial differences: of students with two or more years of foreign language, 77 percent of blacks, 74 percent of Hispanics and 88 percent of whites attended college within four years of high school graduation. The lowest income group also showed improved odds of attending college, when its members had completed two or more years of foreign language.

To return to results for the NELS:88 cohort in 1990 with these HS&B results in mind, about half of white sophomores (49.8 percent) have completed a year or more of geometry, as compared to a third of Hispanic sophomores and just over a third of black sophomores (37.7 percent). Around 40 percent of white sophomores report that they completed two years of foreign language in ninth and tenth grade, while just over a quarter of black sophomores in 1990 report having done so.

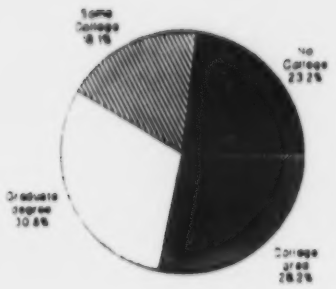
An even larger gap may be seen in tested achievement, however, if we examine the percentage of students scoring in the highest proficiency level in the key subjects of mathematics and reading. The comparison for mathematics is depicted in Figure 5.1. The advanced proficiency level (Math Level 4) represents mastery of conceptual understanding and complex problem solving. Whites are almost five times more likely to fall into the advanced proficiency group in math than are blacks. Percentages of sophomores from different racial/ethnic groups who displayed mastery of conceptual understanding and complex problem solving in mathematics are reported below:

Asian	31.0
Hispanic	12.1
Black	5.8
White	26.5
American Indian	3.5

Figure 5.2 extends the basic comparison here from blacks and whites to blacks, whites and Asians.

Figure 5.1: College Expectations and Mathematics Proficiency of Black Sophomores and White Sophomores, 1990

Educational Expectations of Black and of White 1990 Sophomores



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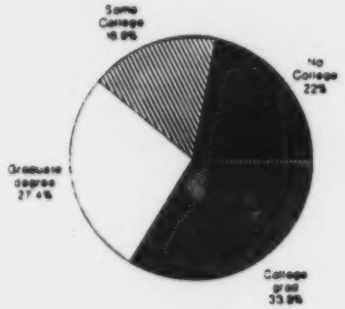

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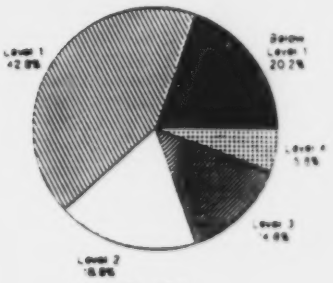
Mathematics Proficiency of Black and of White 1990 Sophomores



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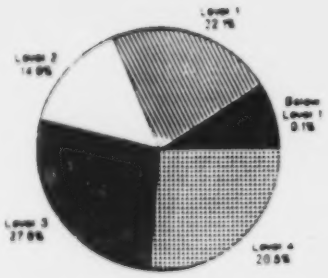

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Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

As shown in Figure 5.2, a higher proportion of Asians than whites expect to complete or go beyond college. Asians are more likely than whites to have completed a year of geometry and two years of foreign language. While Asians appear to out-perform whites at the highest level of mathematics proficiency, it should be noted that this difference is *not* statistically significant.[6]

When the educational expectations of Hispanic tenth graders are considered, perhaps the most striking fact is that Hispanic sophomores expect to graduate from college or attend graduate school less often (46 percent of the time) than Asians (69 percent), blacks (59 percent), or whites (61 percent).[7] However, Hispanic high school sophomores report that their mothers hold high postsecondary aspirations for them at rates similar to those reported by blacks or whites, though somewhat lower (and the difference is statistically significant) than the maternal aspirations for their postsecondary careers reported by Asian sophomores.

While Hispanic sophomores, too, show a pattern of relatively high postsecondary expectations but comparatively low tested achievement in math, the gulf between expectations and achievement is far wider for blacks. And when blacks are compared to whites, the gap between black and white educational expectations is quite small, the gap in enrollment in "gatekeeper" courses is larger, and the gap in tested achievement is larger still. Such disparities are unsettling, but these are differences that have diminished somewhat over time[8] and that may in many key respects be addressed by educational policy. Course taking behavior is alterable: students who aspire to and expect to complete a university education can be given greater opportunities and encouragement to enroll in courses that are most important to college entry and persistence, and that directly influence intermediate results such as high school subject matter achievement levels. Preparation could also be improved in earlier years of schooling, so that more students have the background (and confidence) to enroll in such courses in high school. Additionally, reforms of the mid-1980s that increased state and local graduation standards will increase the number of students who have taken these key courses.

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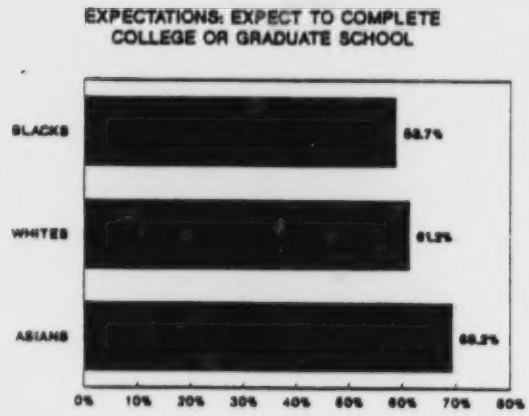
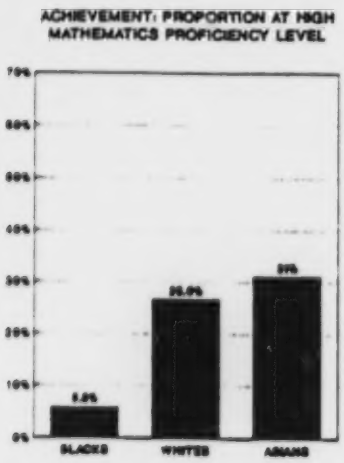
[6]The nonsignificance of this difference (31 percent for Asians, 26 percent for whites) may reflect the small sample sizes within the advanced proficiency level, particularly the small number of Asians and the correspondingly high standard error (3.52). However, the difference between the proportion of Asians in the highest mathematics test quartile (39 percent), and the proportion of whites (32 percent), is indeed statistically significant.

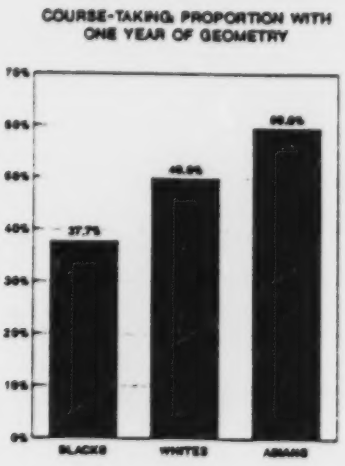
[7]However, when this issue is framed in terms of expectations of going to college, and made to include those who expect to attend but not graduate, the following proportions of sophomores from various racial/ethnic groups expect to go on to college: 82 percent for Asians, 78 percent for whites, 77 percent for blacks, and 72 percent for Hispanics.

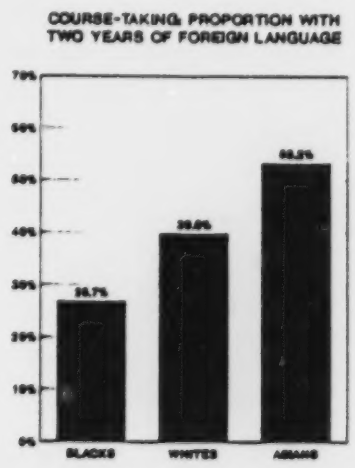
[8]Comparison of HS&B and NELS:88 tenth grade mathematics results shows that both black and Hispanic students gained more than white (or Asian) students when 1980 achievement levels are compared to those of 1990 (Rasinski, Ingels, Rock and Pollack, 1993). NAEP data show the gap between white and black 13 and 17 year olds decreasing significantly in reading when 1990 results are compared to results from 1980 and the 1970s, and that at age 17 black students showed a higher average proficiency in mathematics in 1990 than in 1973 (Mullis, Dossey, Foertsch, Jones and Gentile, 1991). Despite these gains, blacks and Hispanics lagged significantly behind whites in NAEP and NELS:88 1990 test results in both reading and math. HS&B (1980)-NELS:88 (1990) comparisons also show that black-white disparities in (self-reported) academic program placement had shrunk to insignificance by 1990, with 41 percent of black sophomores and 42 percent of white sophomores reporting that they were in an academic/college preparatory program in 1990 (Rasinski, Ingels, Rock and Pollack, 1993). However, despite this increase, the proportion of sophomores who report that they are in an academic/college preparatory program falls considerably below the proportion who expect to complete a four year college degree or more.

Figure 5.2:
College Expectations, Course-Taking, and Tested Achievement of Black, White, and Asian High School Sophomores, 1990









5.5 Sophomores' Preparation for the Transition to College or Work – Sources of Guidance

Although low-SES sophomores report a lower frequency of being urged by counselors to attend college than do their high-SES peers and report a lower level of maternal expectations for their education, sophomores in general appear to be receiving consistently positive advice about college attendance. Overall, sophomores report that both mothers and their school counselors overwhelmingly recommend going on to college (as do fathers and teachers). Counselors appear to be giving the same advice to males and females, and to blacks, whites, Hispanics and Asians (see Table 4.4). For example, 64 percent of Asians, 61 percent of Hispanics, 63 percent of blacks, and 60 percent of whites students reported that they were advised by their counselor to go to college, as were 59 percent of males and 61 percent of females.

Certainly one path that high school students should contemplate is enrollment in college, and at the present time, this is the path most often taken, with about sixty percent of graduating seniors going immediately into a two- or four-year postsecondary institution.[9] However, forty percent do not do so, and many who enter college do not persist. Sophomore perceptions of what their counselors think most important for them to do after graduation seemingly do not stress work, military service, or entering a trade school or apprenticeship program. Over sixty percent of sophomores indicate that their counselors say they should go to college, and another 36 percent say they don't know what counselors think, or that the counselor doesn't care, or that the counselor thinks they should do whatever they want. Only 3.6 percent say that counselors think they should get a full-time job or join the military, or enter trade school or an apprenticeship program. Even for sophomores scoring in the lowest composite (mathematics and reading) test quartile, over half (51.2 percent) report that the advice they hear is that they should go to college, and only four percent report that their counselor recommends they enter a trade school or apprenticeship program. At the same time, over 40 percent of those in the lowest test quartile--who surely are among those most in need of guidance--report that they are getting essentially no message from their counselor at all (4.1 percent say their counselor doesn't care, 9.3 percent say their counselor says they should do what they want, and 26.7 percent say they don't know what their counselor thinks they should do). While it is reassuring that males and females, blacks, whites, Hispanics and Asians are all receiving essentially the same advice from their counselors--namely, to go to college--the NELS:88 sophomore data at least raise the question of whether those least prepared to go to college are being effectively counseled.

There is also a question of whether the minority of students who choose high school vocational programs are being helped to master academic subject matter. The 1990 Amendments to the Carl Perkins Act require programs receiving federal vocational education funds to "integrate academic and vocational education in such programs through coherent sequences of courses so that students achieve both academic and occupational competencies." A compelling reason for this approach is that technologically advanced jobs require high levels of both academic and vocational skills. This report shows that over a fifth of 1990 sophomores who identified themselves as being in the vocational track failed to display mastery of the lowest proficiency level on the NELS:88 mathematics test--that is, they were not proficient at performing simple arithmetical operations on whole numbers. Only 6 percent of vocational track sophomores exhibited conceptual understanding and complex problem solving proficiency on the mathematics test; however, 38 percent of sophomores in the academic track did so.

The findings reported in this volume should be viewed in the context both of past achievement and past group disparities, on the one hand, and on the other, the drive for improvements in education

[9] *The Condition of Education, 1992* indicates that "among 1990 high school graduates, 3 out of 5 were enrolled in college in October 1990--one in a 2-year college and two in a 4-year college" (p.28).

that will permit all students to reach their full potential. An increasing proportion of the students schools are educating come from poor or language minority backgrounds, and may be presumed to face language barriers or to have lesser family resources (for example, levels of parental education, or family income) than students from an English-language or higher socioeconomic status background. Nevertheless, comparison of NELS:88 sophomore math results with those of HS&B sophomores a decade before, and NAEP results over a variety of subjects for the same time period, point to modest improvements in performance,[10] and some narrowing (in most areas) of the gap between Asian and white test performance, on the one hand, and black and Hispanic, on the other. Schools have increased their holding power as well: dropout rates have declined.[11] Data from the 1990 High School Transcripts Study demonstrate that 1990's seniors completed more academic coursework than did 1982 HS&B seniors. Between 1980 and 1990, the percentage of high school graduates enrolling in college in October following graduation increased from 49 percent to 60 percent. Declines or improvements in test scores, graduation rates, and other educational outcomes may reflect school factors or demographic, social, cultural and economic factors. This report, which is descriptive in nature and deals with but one point in time, offers no basis for assessing the source of such changes or their interactions.

Nevertheless, it is clear that whatever improvements may have been won, and whatever their source, much better performance on the part of American students is necessary, both to maximize national economic efficiency and the capacity of all students--regardless of gender, race, or socioeconomic background--to realize their full potential. This report, in describing the achievement of the nation's sophomores, their course taking patterns, expectations, and exposure to curricular practices, points to the need for further explorations of the NELS:88 data, that will provide in-depth analyses of the educational phenomena here described.

[10]A twenty-year perspective suggests that achievement declines of the 1970s were largely reversed in the course of the 1980s and that current achievement levels are very similar to--neither much better nor worse--than those of two decades before. Summarizing NAEP results, *The Condition of Education, 1992* notes that "Generally, the evidence shows little overall change. Average reading proficiency among 9- and 13-year-olds was about the same in 1990 as in 1971; among 17-year-olds it was slightly higher in 1990....Average mathematics proficiency among 9- and 13-year-olds was slightly higher in 1990 than in 1973; among 17-year-olds it was about the same. Average science proficiency among 9- and 13-year-olds was the same in 1990 as in 1970; among 17-year-olds it was lower....Although overall scores have not changed much over two decades, NAEP gives evidence that the large gap in achievement between whites and minorities has narrowed substantially." (p.40)

[11]*The Condition of Education, 1992* indicates that in 1991, 85 percent of 25- to 29-year-olds had completed high school, compared to 78 percent two decades before (p.41 and Table 22-1).

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SUMMARY OF FINDINGS

Summary: Chapter 1

Math Coursework: Geometry, Advanced Math Sequence: Differences by Race/Ethnicity, School Control Type, Socioeconomic Status, Gender, College Expectations

Race/Ethnicity

Advanced Math Sequence.[1]

- Asian sophomores are more likely than white sophomores to have completed advanced course work in mathematics (32 percent for Asians versus 25 percent for whites); however,
- White (25 percent) and Asian (32 percent) sophomores are more likely to have taken advanced course work than are Hispanics or blacks (each, 19 percent) or American Indians (13 percent).

Geometry.

- Almost 60 percent of Asians (59.6 percent) and about half of whites (49.8 percent) reported that they had completed a year of geometry by spring term of sophomore year.
- Some 37.7 percent of blacks, 33.4 percent of Hispanics, and 29.4 percent of American Indians reported that they had completed a year of geometry by spring term of sophomore year.

School Control Type

Advanced Math Sequence.

- The likelihood of falling into the advanced math coursework group is higher for independent school (NAIS)[2] students than for any other school type (63 percent for NAIS versus 23 percent for both public and Catholic and 32 percent for other private).

Geometry.

- Sophomores in public schools are less likely than students in Catholic schools or independent (NAIS) schools to have completed a year of geometry (44 percent of public school sophomores have done so, compared to 85 percent of NAIS sophomores and 74.5 percent of Catholic school sophomores).

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[1]The advanced math sequence comprises a year or more of any combination of Algebra II, trigonometry, precalculus or calculus. The middle level math group comprises those who have taken a year or more of algebra or geometry but have not met the criteria for inclusion in the advanced group. The low group comprises all sophomores whose math course-taking qualifies them neither for the advanced nor for the middle group.

[2]Within the NELS:88 school sample, the term "independent schools" refers to the typically high performance private schools that are members of the National Association of Independent Schools (NAIS).

Socioeconomic Status (SES)[3]

Advanced Math Sequence.

- Students from the highest SES quartile are more than twice as likely to have completed an advanced math sequence than are students from the lowest SES quartile (35 percent for highest, 15 percent for lowest), while 43 percent of lowest SES quartile sophomores were found in the lowest math coursework group, compared to only 9 percent of sophomores from the highest SES quartile.

Geometry.

- Highest SES quartile sophomores are far more likely than lowest SES quartile sophomores to have completed a year of geometry (27 percent for low SES, 68 percent for high SES).

Gender

Advanced Math Sequence.

- Males and females are equally likely to have completed advanced level math coursework.

Geometry.

- Male and female sophomores are equally likely to have completed a year of geometry.

College Expectations

Advanced Math Sequence.

- For sophomores expecting to graduate from college or to earn a graduate or professional degree, 12 percent were in the low math course-taking group, 57 percent were in the middle, and 31 percent had taken an advanced math sequence.

Geometry.

- Some 62 percent of sophomores who expect to complete college or achieve further degrees beyond it have taken a year of geometry;

- However, 38 percent of those sophomores who say that they expect to at least complete college report that they have not completed a year of geometry.

[3]In this report "high SES" and "highest SES quartile" are used synonymously, as are "low SES" and "lowest SES quartile".

Math Class Activities and Resources.

Problem-Solving Activities. While the new mathematics instructional standards emphasize problem-solving activities, only 30 percent of sophomores engage in problem-solving activities often--though more than 80 percent do so at least sometimes.

Student discussion and oral explanation. Some 41 percent of sophomores report they never participate in student-led discussions in math class, while 39 percent of sophomores report that they never explain their work to the class orally. Both practices are recommended by the new mathematics standards.

Resources. Seventy percent of American sophomores report that they never use books in math class other than math texts. Fully 69 percent report never using hands-on material, and only 6 percent do so often. Some 84 percent of sophomores report never using computers. Just over a third report that they use calculators in class frequently, and another 38 percent indicate that they sometimes use calculators. Use of non-textual materials, hands-on material, computers and calculators all are recommended in the new math instructional standards and curriculum guidelines.

Equity. High-SES sophomores are more likely to use calculators in class (40 percent of the highest SES quartile sophomores report frequent use, compared to 30 percent in the lowest quartile). There is also evidence that high-SES sophomores are less likely than their low-SES peers to "never" be asked to explain their math work orally in class (43 percent of the low-SES group report they are never asked to do so, compared to 34 percent of those in the highest SES quartile). However, high-SES sophomores are not more likely (and in some cases are less likely) to follow such other practices recommended in the new mathematics curriculum standards as using books other than a math text or using hands-on material than are sophomores in the lowest SES quartile.

Mathematics Achievement: Quartile Score Differences by **Race/Ethnicity, School Control Type, Socioeconomic Status, Time Spent on Homework,** and **Course-Taking**

Race/Ethnicity

- Asians, followed by whites, show consistently higher mathematics achievement than do Hispanics or blacks. Thus, for example, 39 percent of Asians and 32 percent of whites score in the highest test quartile, as compared to 13 percent of Hispanics and 8 percent of blacks. Likewise, 42 percent of black and 35 percent of Hispanic sophomores scored in the lowest mathematics test quartile, compared to 14 percent of Asians and 17 percent of whites.

School Control

- Sophomores in independent (NAIS) schools show strikingly better mathematics test results than sophomores in any of the other three school types, with more than twice the proportion of sophomores in the top math quartile than Catholic, public, or other private schools. More specifically, some 71.2 percent of independent school sophomores scored in the highest mathematics test quartile, as compared to 35 percent of Catholic school sophomores, 31 percent of tenth graders from other private schools, and 26 percent of sophomores in public schools.

- However, when the socioeconomic status of sophomores in the various types of schools is taken into account, these results must be qualified. For example, when math test performance of students in the highest SES quartile is compared across school types, the difference between NAIS schools and public schools remains significant, though it is diminished, and the difference between public schools and Catholic and Other Private schools disappears. (For high SES quartile sophomores attending NAIS schools, 75.3 percent scored in the highest math quartile, as did 46.8 percent of high-SES public school sophomores, 49 percent of Catholic, and 44.6 percent of other private school high-SES sophomores.

Socioeconomic Status

- Socioeconomic status was a strong predictor of mathematics test results. Over four times more low-SES tenth graders than high-SES tenth graders are in the bottom math achievement quartile while four times more high-SES sophomores than low-SES sophomores are in the highest test quartile. Thus 40 percent of low SES quartile sophomores scored in the lowest mathematics quartile, compared to 9 percent of the high SES sophomores. While 48 percent of the high SES sophomores scored in the highest mathematics quartile, only 8 percent of the low SES sophomores achieved such a score.

Gender

- As in the NELS:88 base year, gender differences in mathematics achievement were comparatively small. Except for the male advantage in the highest math quartile, differences by quartile were not statistically significant. (A similar result is found when male-female differences are examined at the various mastery or proficiency levels--there is a male advantage [25 percent to 20 percent] only at the highest math proficiency level [conceptual understanding and complex problem solving].)

Math coursework

- Achievement in mathematics is associated with enrollment in more advanced courses. Over half (55 percent) of those who have taken only low-level math courses score in the lowest test quartile; just under 3 percent of this group scored in the highest math test quartile. On the other hand, over half (56 percent) of the advanced math group scored in the highest math quartile, with only 8 percent of the advanced math group scoring in the lowest test quartile for mathematics.

Math homework

- Time spent on math homework may reflect a student's level of motivation to achieve, or may reflect the student's pattern of course-taking within mathematics (more homework tends to be assigned in more advanced math classes). For whatever reason some students may do more homework than others, greater time spent in math homework is associated with higher tested achievement in math. Sophomores who spend two or more hours per week on math homework are significantly more likely to score in the highest math test quartile than sophomores who do less math homework (36.5 percent versus 24.0 percent).

Mathematics Achievement: High School Program Differences by Proficiency Scores

- Over a fifth of sophomores who reported themselves to be in the vocational track failed to show mastery of simple arithmetic operations on whole numbers (that is, were below Level 1).

- Sophomores in the academic track were more than twice as likely (38 percent versus 18 percent) to demonstrate mastery of the highest math proficiency level (that is, level 4, conceptual understanding and complex problem solving).

- Sophomores in the academic track were more than six times more likely to score in the highest math proficiency level than were sophomores in the vocational track (38 percent versus 6 percent).

Postsecondary Expectations, Math Course Taking, and Achievement: Differences by Race

- Black and white sophomores show similarity of expectations for completing college. However, this similarity in expectations contrasts with disparities between the two groups in course taking and tested achievement in mathematics. Specifically:

- Some 61 percent of whites and 59 percent of blacks expect to complete at least a four year college degree;

- About half of white sophomores (49.8 percent) have completed a year or more of geometry, as compared to just over a third of black sophomores (37.7 percent).

- In terms of tested sophomore mathematics achievement, whites are almost five times more likely to fall into the advanced proficiency group (those who displayed mastery of conceptual understanding and complex problem solving in mathematics) than are blacks (26.5 percent for whites and 5.8 percent for blacks). White sophomores are four times more likely to score in the highest math quartile than are black sophomores (32 percent versus 8 percent).

Thus, while the college completion expectations of black and white sophomores may be very similar, blacks are less likely to have taken the key college "gatekeeper" course geometry and are less likely to show high tested achievement in mathematics. On the other hand, when Asians and whites are compared, the following contrasts can be drawn:

- Asians have higher postsecondary expectations; 69 percent of Asians expect to complete college, graduate, or professional school, compared to 61 percent of whites.

- Asian sophomores are more likely than whites to have completed a year of geometry (60 percent of Asians have done so, as contrasted to 50 percent of whites).

- More Asian sophomores (39.0 percent) score in the top math achievement quartile than do white tenth graders (31.6 percent).

Summary: Chapter 2

Foreign Language Learning: Differences in Course Work by **race/ethnicity, school control type, socioeconomic status, gender, and postsecondary expectations.**

Race/ethnicity

- Asians are more likely than whites to have taken 2 years of a foreign language by the spring term of sophomore year, but whites are more likely to have completed 2 years of course work than are Hispanics, blacks, or American Indians. Specifically, 53 percent of Asians have 2 years of foreign language by spring of the sophomore year, as compared to 40 percent of whites, 29 percent of Hispanics, 27 percent of blacks, and 21 percent of American Indians.

School control type

- Catholic and independent school students are significantly more likely than public school students to fall in the highest group, that is, to have taken 2 years of foreign language by spring of the sophomore year. Specifically, viewed in terms of the highest completion level, 83 percent of independent school students and 73 percent of Catholic school students have completed 2 years of foreign language, as contrasted to only 34 percent of public school students and 29 percent of students in non-Catholic, non-NAIS private schools.

Socioeconomic status (SES)

- The highest SES group is almost three times as likely to have taken a full 2 years of foreign language in ninth and tenth grade as is the lowest SES group (58 percent versus 17 percent).

Gender

- There are significant male-female differences in foreign language enrollment. In particular, females are more likely to have taken a full 2 years of foreign language over this period (34 percent of males versus 41 percent of females).

Postsecondary Expectations

Finally, **postsecondary expectations** are related to foreign language course-taking. Fully two thirds of sophomores who do not expect to go on to college have taken no foreign language or only a semester; about half of those who expect to graduate from college took two years of foreign language over ninth and tenth grade, and over a quarter of those who expect to attend but not graduate from college have taken two years of foreign language during ninth and tenth grade.

Science

Science Instructional Practices and Resources.

For sophomores in 1990, conventional, rather than reformed instructional methods, prevailed by and large. The relatively passive learning techniques of copying teacher notes from the blackboard are cited by 62 percent of students as every day or almost every day occurrences in their science classes. Although the desirability of lessened dependence on the lecture and recitation method of teaching has been stressed by science education reformers, three quarters of sophomores indicated that every day or almost every day they listen to the teacher lecture. In terms of active, self-directed, inquiry-based approaches to science learning, three quarters of 1990 sophomores indicate that they very rarely if ever make up their own problems and work out their own methods to investigate them. Likewise 76 percent indicate that they very rarely or never design and conduct experiments or projects on their own, while 74 respond that they very rarely make up their own choice of science topic or problem to study.

Some 88 percent indicate that very rarely (that is, either never or less than once a month) do they use computers to write up experiments or reports; 91 percent indicate that they very rarely use computers for collecting and/or analyzing science data; 89 percent indicate that they very rarely use computers to do calculations, and 91 percent indicate that they very rarely use computers for modeling or simulation.

Postsecondary Expectations and Course Taking: Black-White Differences

Data presented in Chapter 1 show that expectations for completing a four year college degree course or higher were similar for white and black 1990 sophomores (61 percent of white and 59 percent of black tenth graders expressed this expectation), but that level of mathematics preparation was somewhat lower for black students and tested achievement much lower.

A similar pattern can be discerned in the data presented in Chapter 2. In terms of the key college "gatekeeper" foreign language course, 40 percent of whites but only 27 percent of blacks report that they completed two years of instruction in this area since leaving eighth grade.

Summary: Chapter 3

Family Interaction: Decision Making about Schooling and Work

Choosing School Courses. Some 43 percent of sophomores report that they decide by themselves--that is, without parental consultation--which classes they will take in high school. Levels of autonomous decision making among tenth graders vary significantly, however, by factors such as socioeconomic status, average grades, course levels, and family composition.

Socioeconomic Status (SES). The majority (56.2 percent) of lowest SES quartile sophomores report making course selection decisions entirely on their own, while the majority of highest SES quartile sophomores (63.3 percent) report making such decisions either together with their parents (27.4 percent) or after consultation with their parents 35.9 percent).

Grades. Fifty-six percent of sophomores receiving mostly D's in mathematics report making course-taking decisions by themselves, as compared to a lesser proportion of higher-achieving students (39 percent receiving mostly A's and 42 percent receiving mostly B's).

Course Levels. Fifty-two percent of tenth graders in low-level math classes compared with 37 percent of the advanced math students report making course-taking decisions by themselves.

Family Composition. Sophomores living with their natural mother and father report making independent course taking decisions less frequently than those who live with guardians only (39.1 percent compared to 58.3 percent).

Race/ethnicity. Black and Hispanic sophomores are somewhat more likely than white sophomores to report making course selections entirely on their own (black: 50 percent; Hispanic: 50 percent; white: 41 percent).

Decisions on Whether to Attend College

Some 39 percent of sophomores report that they independently decide whether or not they will attend a postsecondary institution. Some 28 percent report making this decision together with parents, and 20 percent report deciding by themselves after consultation with their parents. Decision-making patterns for college attendance vary significantly by factors such as academic performance and course level placement, parent education levels, and family educational expectations.

Academic Performance. Thirty-seven percent of sophomores receiving mostly A's in math and 37 percent of sophomores receiving mostly B's report making college attendance decisions by themselves, compared to 49 percent of sophomores receiving mostly D's in math classes.

Parent Education Level. Forty-five percent of sophomores whose parents did not receive a high school diploma report making college decisions by themselves, while only 30 percent of those with one or more parents educated to the Ph.D. level report the same.

Family Education Expectations. Thirty-three percent of sophomores in families where the expectation is for them to graduate from college report no parental interaction in the decision making process. This compares to 61 percent of sophomores in families when the expectation is for them to only graduate from high school making an independent decision.

Discussion of College Examinations

Only a small percentage of sophomores report discussing the Scholastic Aptitude Test/American College Test (SAT/ACT) with their parents. Only 9 percent report discussing these tests "often" with their parents, whereas 53 percent report "never" having discussed these tests. However, significant differences appear by variables such as parent education, and socioeconomic status.

Parent Education. Of sophomores whose parents received less than a high school education, 63.7 percent report "never" discussing preparation for the ACT/SAT. Of sophomores whose parents were educated to the Ph.D. level, the percentage reporting "never" discussing these tests drops to 30.0 percent.

Socioeconomic Status. Sophomores in the lowest socioeconomic quartile report never discussing college entrance tests more than one and a half times more frequently than do sophomores in the highest socioeconomic quartile (62.5 percent compared to 39.4 percent)

Decisions on Student Employment

About 58 percent of sophomores report being employed. Some 38 percent of sophomores indicate that they make decisions on employment themselves, 24 percent report that they make the decision after discussion with parents, and 25 percent report making the decision together with their parents. However, while 44 percent of low-SES sophomores report individual decision making in whether or not to have a job, only 32 percent of high-SES sophomores do so.

Parental Regulation

Time Spent with Friends. Sixty-six percent of sophomores report that their time spent with friends is "often" or "sometimes" regulated.

A higher percentage (37 percent) of females report being regulated "often" than males (30 percent).

Checking of Homework. Fifty-seven percent of sophomores report that their homework is checked "often" or "sometimes".

Twenty-two 22 percent of sophomore students in the low-SES category report that their homework is checked "often" compared to 30 percent of sophomores in the high-SES category reporting the same.

Limits on Television Viewing. Only 10 percent of sophomores report having limits placed on their television viewing "often." An additional 21 percent report having limits placed on television viewing "sometimes."

Males report higher rates of limitation than females, 46 to 39 percent respectively.

Asian sophomores report being limited much more frequently than students in other racial/ethnic groups, with only 29 percent reporting that their parents never limited their television watching. This compares to almost half (47 percent) of blacks reporting that they never receive limitations.

How Students Spend Their Time: Television, Work, Homework, Extracurricular Activities, and Reading

Time Budgets: 1990 sophomores spent, on average:

18.3 hours per week in *television viewing*;

2.3 hours per week in *reading for pleasure*;

4.3 hours per week on *homework*;

10.7 hours per week *working for pay*; and

3.3 hours per week on *extracurricular activities*.

Sophomores in the lowest grade category (mostly D's) watch an average of 3.7 more hours of television per week than those in the highest grade category (mostly A's). These same students work 2.5 hours more per week on outside jobs than do their higher-achieving counterparts.

Summary: Chapter 4

Educational Expectations: Graduating from High School

Eighty-six percent of sophomores report that they are very sure that they will graduate from high school. Only 1.6 percent report that they probably will not graduate or are very sure that they will not graduate.

Eighty-nine percent of white tenth graders report that they are very sure of graduating. Only 74 percent of Hispanic sophomores report that they are very sure they will graduate. Black sophomores are the group most likely to report they probably will not or are very sure they will not graduate with 2.7 percent reporting so.

Only 74 percent of sophomores whose parents did not finish high school and 83 percent of those whose parents finished high school but received no further education report that they are very sure of graduating. 96 percent of sophomores whose parents have graduate degrees report the same.

Sophomores in the lowest SES group are the least likely to report that they are very sure of graduating (77 percent). Sophomores in the highest SES group are most likely to report the same (at 93 percent).

Sophomores who have had most of their close friends drop out report at the highest rates that they probably will not or are very sure they will not graduate (8.4 percent).

Educational Expectations: Postsecondary Schooling

Thirty-two percent of high school tenth graders expect their highest educational attainment to be college graduation, and an additional 27 percent expect to receive graduate degrees. 18 percent plan to attend some college, and 13 percent plan to attend vocational, trade, or business school. 10 percent expect to stop their education at the high school level, and .6 percent report no plans to finish high school.

Tenth grade females report at a significantly higher rate than their male peers that they expect to receive a graduate degree (31.0 percent compared to 23.9 percent).

Hispanics and American Indians are the two groups least likely to report plans for college graduation or graduate school (46.6 percent and 38.3 percent respectively). 69.2 percent of Asians, 61.2 percent of whites, and 58.7 percent of blacks report plans for college or graduate school completion.

Twenty-two percent of sophomores in the lowest SES levels report expecting to complete no more than high school graduation. In the highest SES levels, only 1.7 percent report expecting no further education beyond the high school level.

Steps Toward College

Fifty-six percent of sophomores report that they plan to or have taken the PSAT, 8 percent report that they do not plan to take the PSAT, and 36 percent report that they have not thought about taking or not taking the PSAT.

Sixty-one percent of sophomores report that they plan to or have taken the SAT, 7 percent report that they do not plan to take the SAT, and 32 percent report that they have not though about taking or not taking the SAT.

Forty percent of sophomores report that they plan to or have taken the ACT, 10 percent report that they do not plan to take the ACT, and 50 percent report that they have not though about taking or not taking the SAT.

Of sophomores who plan to receive graduate degrees, 84 percent plan to take the SAT, 2 percent do not plan to take the test, and 14 percent have not thought about it.

Guidance and Influences

Sixty percent of sophomores report that their guidance counselor would have them go to college. 26 percent of sophomores report that they do not know what their counselor would have them do.

Fifty-two percent of sophomores in the lowest SES quartile report that their counselor would advise them to attend college. 72 percent of sophomores in the highest SES quartile report the same.

Forth-seven percent of sophomores in the lowest SES quartile report that their mother would want them to complete college or graduate school. In contrast, 84 percent or sophomores in the highest SES quartile report that their mother would want them to complete college or graduate school.

APPENDIX A: Standard Errors and Sample Sizes

Note: In the following tables, "s.e." stands for Standard Error, and "unwt n" stands for the unweighted (sample) N (number) of cases used in this analysis.

Table A1.2
Math Course Taking

		LOW	MIDDLE	ADVANCED
STANDARD ERRORS				
Total		0.70	0.81	0.74
		17082	17082	17082
SEX				
Male	s.e.	0.96	1.04	0.92
	unwt n	8497	8497	8497
Female	s.e.	0.83	1.00	0.83
	unwt n	8585	8585	8585
RACE/ETHNICITY				
Asian	s.e.	2.04	2.55	2.56
	unwt n	1122	1122	1122
Hispanic	s.e.	1.97	2.11	1.80
	unwt n	2035	2035	2035
Black	s.e.	2.51	2.26	1.43
	unwt n	1663	1663	1663
White	s.e.	0.74	0.94	0.91
	unwt n	11975	11975	11975
Am Indian	s.e.	8.54	7.17	3.16
	unwt n	181	181	181
SOCIOECONOMIC STATUS				
Lowest	s.e.	1.40	1.37	1.05
	unwt n	3471	3471	3471
Second	s.e.	1.33	1.44	1.18
	unwt n	3973	3973	3973
Third	s.e.	1.07	1.28	1.08
	unwt n	4084	4084	4084
Highest	s.e.	0.99	1.39	1.36
	unwt n	5049	5049	5049

Note: Unweighted *N*'s are row total *N*'s.

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A1.2
Math Course Taking
(continued)

		LOW	MIDDLE	ADVANCED
SCHOOL CONTROL				
Public	s.e.	0.74	0.85	0.76
	unwt n	14658	14658	14658
Catholic	s.e.	1.58	2.95	2.78
	unwt n	964	964	964
NAIS	s.e.	4.00	5.87	6.77
	unwt n	1048	1048	1048
Other private	s.e.	3.85	5.33	5.29
	unwt n	379	379	379
COLLEGE EXPECTATIONS				
No college	s.e.	1.41	1.30	0.75
	unwt n	3497	3497	3497
Some college, won't graduate	s.e.	1.40	1.60	1.14
	unwt n	2776	2776	2776
Graduate, graduate plus	s.e.	0.69	1.04	0.98
	unwt n	10618	10618	10618

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A1.3
Geometry Coursework by Background Characteristics

		Less than 1 year	1 Year or more
STANDARD ERRORS			
Total	s.e.	0.93	0.93
	unwt n	16290	16290
SEX			
Male	s.e.	1.14	1.14
	unwt n	07992	07992
Female	s.e.	1.11	1.11
	unwt n	8298	8298
RACE/ETHNICITY			
Asian	s.e.	2.91	2.91
	unwt n	1088	1088
Hispanic	s.e.	1.72	1.72
	unwt n	1911	1911
Black	s.e.	2.42	2.42
	unwt n	1575	1575
White	s.e.	1.08	1.08
	unwt n	11448	11448
Am Indian	s.e.	5.88	5.88
	unwt n	171	171
SOCIOECONOMIC STATUS			
Lowest	s.e.	1.18	1.18
	unwt n	3238	3238
Second	s.e.	1.32	1.32
	unwt n	3770	3770
Third	s.e.	1.37	1.37
	unwt n	3913	3913
Highest	s.e.	1.48	1.48
	unwt n	4920	4940

Table A1.3
Geometry Coursework by Background Characteristics
(continued)

		Less than 1 year	1 Year or more
SCHOOL CONTROL			
Public	s.e.	0.93	0.93
	unwt n	13914	13914
Catholic	s.e.	2.82	2.82
	unwt n	951	951
NAIS	s.e.	4.93	4.93
	unwt n	1024	1024
Other private	s.e.	6.11	6.11
	unwt n	370	370
COLLEGE EXPECTATIONS			
No college	s.e.	1.07	1.07
	unwt n	3220	3220
Some college, won't graduate	s.e.	1.43	1.43
	unwt n	2626	2626
Graduate, graduate plus	s.e.	1.12	1.12
	unwt n	10267	10267

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A1.5
Use books other than text books

		NEVER	SOMETIMES	OFTEN
STANDARD ERRORS				
Total	s.e.	0.64	0.51	0.43
	unwt n	16968	16968	16968
SEX				
Male	s.e.	0.84	0.71	0.60
	unwt n	8387	8387	8387
Female	s.e.	0.84	0.69	0.61
	unwt n	8581	8581	8581
RACE/ETHNICITY				
Asian	s.e.	2.51	2.03	1.59
	unwt n	1121	1121	1121
Hispanic	s.e.	1.69	1.40	1.32
	unwt n	2003	2003	2003
Black	s.e.	1.93	1.41	1.59
	unwt n	1609	1609	1609
White	s.e.	0.72	0.59	0.48
	unwt n	11947	11947	11947
American Indian	s.e.	6.32	4.36	6.27
	unwt n	178	178	178
SOCIOECONOMIC STATUS				
Lowest	s.e.	1.43	1.26	1.11
	unwt n	3410	3410	3410
Second	s.e.	1.16	0.94	0.75
	unwt n	3904	3904	3904
Third	s.e.	1.01	0.78	0.68
	unwt n	4070	4070	4070
Highest	s.e.	1.22	1.01	0.85
	unwt n	5095	5095	5095

Table A1.5
Use books other than text books
(continued)

		NEVER	SOMETIMES	OFTEN
SCHOOL CONTROL				
Public	s.e.	0.67	0.53	0.45
	unwt n	14525	14525	14525
Catholic	s.e.	2.19	1.92	1.23
	unwt n	972	972	972
NAIS	s.e.	9.57	10.36	3.18
	unwt n	1062	1062	1062
Other private	s.e.	4.47	2.81	3.67
	unwt n	376	376	376

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A1.6
Use Hands-On Material, by background characteristics

		NEVER	SOMETIMES	OFTEN
STANDARD ERRORS				
Total	s.e.	0.63	0.58	0.29
	unwt n	16930	16930	16930
SEX				
Male	s.e.	0.84	0.78	0.35
	unwt n	8365	8365	8365
Female	s.e.	0.85	0.76	0.44
	unwt n	8565	8565	8565
RACE				
Asian	s.e.	2.37	2.23	1.20
	unwt n	1119	1119	1119
Hispanic	s.e.	1.40	1.41	0.85
	unwt n	1998	1998	1998
Black	s.e.	1.97	1.77	1.34
	unwt n	1602	1602	1602
White	s.e.	0.74	0.68	0.30
	unwt n	11924	11924	11924
Am Indian	s.e.	6.48	5.15	2.97
	unwt n	178	178	178
SOCIOECONOMIC STATUS				
Lowest	s.e.	1.27	1.09	0.77
	unwt n	3398	3398	3398
Second	s.e.	1.21	1.11	0.56
	unwt n	3895	3895	3895
Third	s.e.	1.09	1.02	0.59
	unwt n	4055	4055	4055
Highest	s.e.	1.11	1.07	0.39
	unwt n	5096	5096	5096

Table A1.6
Use Hands-On Material, by background characteristics
(continued)

		NEVER	SOMETIMES	OFTEN
SCHOOL CONTROL				
Public	s.e.	0.66	0.60	0.29
	unwt n	14487	14487	14487
Catholic	s.e.	2.57	2.38	1.28
	unwt n	969	969	969
NAIS	s.e.	5.56	4.51	2.50
	unwt n	1066	1066	1066
Other private	s.e.	3.71	3.75	1.07
	unwt n	375	375	375

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A1.7
Explain Your Work to the Class Orally, by Background Characteristics

		OFTEN	SOMETIMES	NEVER
STANDARD ERRORS				
Total	s.e.	0.75	0.85	0.72
	unwt n	16930	16930	16930
SEX				
Male	s.e.	0.93	1.04	.94
	unwt n	8365	8365	8365
Female	s.e.	1.02	1.05	.94
	unwt n	8478	8478	8478
RACE/ETHNICITY				
Asian	s.e.	2.87	2.70	2.38
	unwt n	1113	1113	1113
Hispanic	s.e.	2.29	1.65	2.04
	unwt n	1998	1998	1998
Black	s.e.	2.08	1.79	2.07
	unwt n	1602	1602	1602
White	s.e.	0.85	1.03	.83
	unwt n	11924	11924	11924
Am Indian	s.e.	6.61	4.01	4.97
	unwt n	178	178	178
SOCIOECONOMIC STATUS				
Lowest	s.e.	1.55	1.46	1.35
	unwt n	3398	3398	3398
Second	s.e.	1.20	1.30	1.27
	unwt n	3895	3895	3895
Third	s.e.	1.14	1.31	1.22
	unwt n	4055	4055	4055
Highest	s.e.	1.18	1.41	1.31
	unwt n	5096	5096	5096

Table A1.7
Explain Your Work to the Class Orally, by Background Characteristics
(continued)

		OFTEN	SOMETIMES	NEVER
SCHOOL CONTROL				
Public	s.e.	0.78	0.89	0.74
	unwt n	14487	14487	14487
Catholic	s.e.	3.42	3.32	3.48
	unwt n	969	969	969
NAIS	s.e.	5.33	7.15	3.80
	unwt n	1066	1066	1066
Other private	s.e.	5.91	5.06	7.37
	unwt n	375	375	375

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A1-8
Use Calculators, by Background Characteristics

		NEVER	SOMETIMES	OFTEN
STANDARD ERRORS				
Total	s.e.	0.62	0.60	0.56
	unwt n	16930	16930	16930
SEX				
Male	s.e.	0.84	0.79	0.74
	unwt n	8365	8365	8365
Female	s.e.	0.84	0.87	0.78
	unwt n	8576	8576	8576
RACE/ETHNICITY				
Asian	s.e.	2.57	2.64	1.83
	unwt n	1122	1122	1122
Hispanic	s.e.	1.69	1.73	1.38
	unwt n	1998	1998	1998
Black	s.e.	1.76	1.81	2.25
	unwt n	1602	1602	1602
White	s.e.	0.74	0.69	0.62
	unwt n	11924	11924	11924
Am Indian	s.e.	4.14	5.63	3.35
	unwt n	178	178	178
SOCIOECONOMIC STATUS				
Lowest	s.e.	1.29	1.34	1.28
	unwt n	3398	3398	3398
Second	s.e.	1.19	1.12	1.15
	unwt n	3895	3895	3895
Third	s.e.	1.22	1.17	1.01
	unwt n	4055	4055	4055
Highest	s.e.	1.12	1.14	0.96
	unwt n	5096	5096	5096

Table A1-8
Use Calculators, by Background Characteristics
(continued)

		NEVER	SOMETIMES	OFTEN
SCHOOL CONTROL				
Public	s.e.	0.65	0.62	0.57
	unwt n	14487	14487	14487
Catholic	s.e.	2.54	2.84	2.82
	unwt n	969	969	969
NAIS	s.e.	4.92	7.80	5.46
	unwt n	1066	1066	1066
Other private	s.e.	4.76	4.88	2.84
	unwt n	375	375	375

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Standard Errors for Table A1.10:
1990 Sophomore Mathematics Proficiency Results by Various Characteristics

Percentage of 1990 Sophomores at Each Proficiency Level		Below Level 1	Level 1	Level 2	Level 3	Level 4
Total	s.e.	0.63	0.88	0.70	0.86	0.83
	unwt n	14,603	14,603	14,603	14,603	14,603
SEX						
Male	s.e.	0.91	1.21	1.00	1.20	1.21
	unwt n	7,309	7,309	7,309	7,309	7,309
Female	s.e.	0.86	1.27	0.99	1.24	1.13
	unwt n	7,294	7,294	7,294	7,294	7,294
RACE/ETHNICITY						
Asian	s.e.	1.89	2.97	2.17	3.62	3.52
	unwt n	994	994	994	994	994
Hispanic	s.e.	2.11	2.83	2.11	2.16	1.89
	unwt n	1,717	1,717	1,717	1,717	1,717
Black	s.e.	2.55	3.14	2.36	2.24	1.49
	unwt n	1,429	1,429	1,429	1,429	1,429
White	s.e.	0.68	0.98	0.84	1.06	1.05
	unwt n	10,244	10,244	10,244	10,244	10,244
SOCIOECONOMIC STATUS						
Lowest	s.e.	1.70	2.18	1.63	1.58	1.13
	unwt n	2,967	2,967	2,967	2,967	2,967
Second	s.e.	1.41	1.91	1.56	1.78	1.49
	unwt n	3,335	3,335	3,335	3,335	3,335
Third	s.e.	1.21	1.71	1.51	1.84	1.68
	unwt n	3,495	3,495	3,495	3,495	3,495
Highest	s.e.	0.74	1.21	1.09	1.67	1.78
	unwt n	4,403	4,403	4,403	4,403	4,403

Table A1.10:
1990 Sophomore Mathematics Proficiency Results by Various Characteristics
(continued)

Percentage of 1990 Sophomores at Each Proficiency Level		Below Level 1	Level 1	Level 2	Level 3	Level 4
SCHOOL CONTROL						
Public	s.e.	0.70	0.96	0.76	0.92	0.87
	unwt n	12,514	12,514	12,514	12,514	12,514
Catholic	s.e.	1.57	3.32	3.02	3.78	3.85
	unwt n	835	835	835	835	835
NAIS	s.e.	1.85	0.83	2.42	3.06	3.80
	unwt n	913	913	913	913	913
Other Private	s.e.	2.93	5.14	4.40	6.53	6.03
	unwt n	317	317	317	317	317
HIGH SCHOOL PROGRAM						
Gen. HS Program	s.e.	1.00	1.42	1.18	1.37	1.21
	unwt n	5,803	5,803	5,803	5,803	5,803
Academic program	s.e.	0.66	1.14	1.08	1.52	1.59
	unwt n	5,343	5,343	5,343	5,343	5,343
Vocational, tech.	s.e.	2.73	3.32	2.28	2.40	1.59
	unwt n	1,286	1,286	1,286	1,286	1,286
Other prog., D.K.	s.e.	2.21	2.72	2.02	2.03	1.54
	unwt n	1,837	1,837	1,837	1,837	1,837
HOURS OF HOMEWORK PER WEEK						
None	s.e.	8.41	8.11	4.36	4.61	2.96
	unwt n	202	202	202	202	202
Up to 2 hours	s.e.	1.94	2.37	1.73	1.90	1.69
	unwt n	2,347	2,347	2,347	2,347	2,347
2 to 5 hours	s.e.	1.16	1.67	1.36	1.55	1.39
	unwt n	4,359	4,359	4,359	4,359	4,359
> 5 hours	s.e.	0.69	1.11	0.96	1.26	1.26
	unwt n	7,543	7,543	7,543	7,543	7,543

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Standard Errors for Table A1.11:
Math Test Quartile by background characteristics, opportunity to learn, and instructional factors.

MATHEMATICS TEST QUARTILE:		Lowest Qtle	22 - 49%	50 - 74%	Highest Qtle
RACE/ETHNICITY					
Asian	s.e.	2.11	2.15	2.27	2.57
	unwt n	1092	1092	1092	1092
Hispanic	s.e.	1.78	1.63	1.32	1.01
	unwt n	1968	1968	1968	1968
Black	s.e.	2.53	2.24	1.69	1.06
	unwt n	1620	1620	1620	1620
White	s.e.	0.60	0.61	0.58	0.77
	unwt n	11741	11741	11741	11741
American Indian	s.e.	5.82	3.64	3.76	2.84
	unwt n	189	189	189	189
SCHOOL CONTROL					
Public	s.e.	0.67	0.60	0.54	0.66
	unwt n	14345	14345	14345	14345
Catholic	s.e.	2.03	2.24	2.80	2.89
	unwt n	952	952	952	952
NAIS	s.e.	4.11	4.46	2.94	6.55
	unwt n	988	988	988	988
Other Private	s.e.	3.05	3.37	2.82	3.61
	unwt n	370	370	370	370
SOCIOECONOMIC STATUS					
Lowest	s.e.	1.26	1.25	0.97	0.62
	unwt n	3395	3395	3395	3395
Second	s.e.	1.17	1.24	1.03	0.96
	unwt n	3882	3882	3882	3882
Middle	s.e.	0.99	1.12	1.12	1.01
	unwt n	3997	3997	3997	3997
High	s.e.	0.95	0.79	1.00	1.24
	unwt n	4933	4933	4933	4933

Standard Errors for Table A1.11:
Math Test Quartile by background characteristics, opportunity to learn, and instructional factors.
(continued)

MATHEMATICS TEST QUARTILE:		Lowest Qtle	22 - 49%	50 - 74%	Highest Qtle
Sex					
Male	s.e.	0.85	0.79	0.72	0.86
	unwt n	8304	8304	8304	8304
Female	s.e.	0.80	0.78	0.76	0.81
	unwt n	8378	8378	8378	8378
Math Coursework Level					
Low	s.e.	1.41	1.33	0.72	0.46
	unwt n	3682	3682	3682	3682
Middle	s.e.	0.61	0.82	0.80	0.84
	unwt n	8543	8543	8543	8543
Advanced	s.e.	0.69	0.87	1.07	1.42
	unwt n	4374	4374	4374	4374
Instructional Demand: Asked to Show Understanding in Math					
Not Taking*	s.e.	3.14	4.03	2.27	1.87
	unwt n	451	451	451	451
Never Asked	s.e.	1.77	1.73	1.81	1.40
	unwt n	1409	1409	1409	1409
Less Than Once a Weeks.e.		1.23	1.23	1.30	1.35
	unwt n	2009	2009	2009	2009
About Once a Week	s.e.	1.13	1.42	1.21	1.39
	unwt n	2608	2608	2608	2608
A Few Times a Week	s.e.	1.14	1.12	1.07	1.18
	unwt n	3859	3859	3859	3859
Almost Every Day	s.e.	1.01	0.98	0.92	1.04
	unwt n	6211	6211	6211	6211
Perceived Instructional and Curricular Emphasis: Math Facts/Rules Emphasis					
None	s.e.	2.33	2.13	2.00	1.44
	unwt n	648	648	648	648
Minor Emphasis	s.e.	1.54	1.73	1.20	1.10
	unwt n	2081	2081	2081	2081

Standard Errors for Table A1.11:
Math Test Quartile by background characteristics, opportunity to learn, and instructional factors.
(continued)

		Lowest Qtle	22 - 49%	50 - 74%	Highest Qtle
Moderate Emphasis	s.e.	1.23	0.98	0.98	0.96
	unwt n	4870	4870	4870	4870
Major Emphasis	s.e.	0.65	0.77	0.72	0.88
	unwt n	8603	8603	8603	8603
Math Problem-Solving Emphasis					
None	s.e.	2.10	2.05	2.00	1.50
	unwt n	785	785	785	785
Minor Emphasis	s.e.	1.55	1.41	1.33	1.21
	unwt n	1860	1860	1860	1860
Moderate Emphasis	s.e.	1.06	1.08	0.94	1.12
	unwt n	4933	4933	4933	4933
Major Emphasis	s.e.	0.79	0.73	0.77	0.87
	unwt n	8613	8613	8613	8613
Instructional Technique: Review Math From Previous Day					
Never	s.e.	2.00	1.71	1.59	1.28
	unwt n	1251	1251	1251	1251
Sometimes	s.e.	1.05	0.89	0.81	1.04
	unwt n	5405	5405	5405	5405
Often	s.e.	0.73	0.79	0.70	0.86
	unwt n	9582	9582	9582	9582
Mathematics Homework:					
Less than 2 hours/week	s.e.	0.82	0.69	0.65	0.79
	unwt n	9886	9886	9886	9886
Two hours or more/week	s.e.	0.84	0.98	0.94	1.10
	unwt n	5725	5725	5725	5725

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A1.12:
Highest SES Quartile Sophomores in the Highest Math Quartile by School Control

SCHOOL CONTROL	Highest Math Quartile
Public	
s.e.	1.30
unwt n	3415
Catholic	
s.e.	4.04
unwt n	427
NAIS	
s.e.	5.24
unwt n	868
Other Private	
s.e.	6.31
unwt n	216

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A2.1
Foreign Language Coursework by Background Characteristics

		LESS THAN 1 YEAR	1 - 1.5 YEARS	2 YEARS
STANDARD ERRORS				
Total		0.84	0.63	0.92
SEX				
Male	s.e.	1.10	0.80	1.08
	unwt n	8001	8001	8001
Female	s.e.	1.00	0.84	1.16
	unwt n	8330	8330	8330
RACE/ETHNICITY				
Asian	s.e.	2.47	2.23	3.03
	unwt n	1093	1093	1093
Hispanic	s.e.	1.99	2.11	1.95
	unwt n	1927	1927	1927
Black	s.e.	2.47	1.59	2.33
	unwt n	1557	1557	1557
White	s.e.	0.95	0.72	1.06
	unwt n	11483	11483	11483
American Indian	s.e.	6.98	3.35	5.86
	unwt n	170	170	170
SOCIOECONOMIC STATUS				
Lowest	s.e.	1.39	1.22	0.94
	unwt n	3261	3261	3261
Second	s.e.	1.39	1.12	1.28
	unwt n	3773	3773	3773
Third	s.e.	1.38	1.01	1.42
	unwt n	3924	3924	3924
Highest	s.e.	1.09	1.14	1.48
	unwt n	4917	4917	4917

Table A2.1
Foreign Language Coursework by Background Characteristics-(continued)

		LESS THAN 1 YEAR	1 - 1.5 YEARS	2 YEARS
SCHOOL CONTROL				
Public	s.e.	0.88	0.64	0.95
	unwt n	13968	13968	13968
Catholic	s.e.	2.12	2.29	2.99
	unwt n	938	938	938
NAIS	s.e.	5.40	2.59	5.86
	unwt n	1025	1025	1025
Other private	s.e.	6.53	6.66	6.51
	unwt n	368	368	368
COLLEGE EXPECTATIONS				
No College	s.e.	1.30	1.11	0.80
	unwt n	3238	3238	3238
Some College, won't graduate	s.e.	1.57	1.43	1.48
	unwt n	2631	2631	2631
Graduate, Graduate plus	s.e.	0.93	0.77	1.12
	unwt n	10285	10285	10285

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

TABLE A3.1
Standard Error of tenth graders making decisions on which classes, by selected background characteristics

		Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
TOTAL	s.e.	0.17	0.32	0.58	0.58	0.71
	unwt n	15656	15656	15656	15656	15656
SEX						
Male	s.e.	0.28	0.52	0.77	0.88	0.96
	unwt n	7586	7586	7586	7586	7586
Female						
	s.e.	0.19	0.38	0.76	0.78	0.96
	unwt n	8070	8070	8070	8070	8070
RACE						
Asian						
	s.e.	0.46	1.36	1.89	2.10	2.40
	unwt n	1030	1030	1030	1030	1030
Hispanic						
	s.e.	0.48	0.88	2.07	1.51	2.28
	unwt n	1718	1718	1718	1718	1718
Black						
	s.e.	0.76	1.63	1.85	2.24	2.48
	unwt n	1394	1394	1394	1394	1394
White						
	s.e.	0.18	0.29	0.63	0.64	0.76
	unwt n	11292	11292	11292	11292	11292
American Indian						
	s.e.	1.66	8.94	3.08	4.92	6.91
	unwt n	161	161	161	161	161

TABLE A3.1
Standard Error of tenth graders making decisions on which classes, by selected background characteristics (continued)

		Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
FAMILY COMPOSITION						
Mother & Father						
	s.e.	0.21	0.33	0.65	0.66	0.78
	unwt n	10428	10428	10428	10428	10428
Father & Female Guardian						
	s.e.	0.54	3.06	2.55	2.83	3.86
	unwt n	440	440	440	440	440
Father only						
	s.e.	0.44	1.08	5.15	6.14	5.08
	unwt n	436	436	436	436	436
Mother & Male Guar						
	s.e.	0.57	0.66	1.59	2.11	2.26
	unwt n	1735	1735	1735	1735	1735
Mother only						
	s.e.	0.52	1.32	1.10	1.23	1.58
	unwt n	2175	2175	2175	2175	2175
Other Adult						
	s.e.	0.69	1.54	4.90	2.54	4.70
	unwt n	386	386	386	386	386
SOCIOECONOMIC STATUS						
Lowest						
	s.e.	0.45	0.84	1.22	0.99	1.38
	unwt n	3047	3047	3047	3047	3047
Second						
	s.e.	0.32	0.84	1.22	0.99	1.38
	unwt n	3629	3629	3629	3629	3629
Third	s.e.	0.30	0.46	1.00	1.13	1.28
	unwt n	3788	3788	3788	3788	3788
Highest	s.e.	0.36	0.48	1.04	1.19	1.14
	unwt n	4783	4783	4783	4783	4783

TABLE A3.1
Standard Error of tenth graders making decisions on which classes, by selected background characteristics (continued)

	Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
MATH GRADES					
Mostly A					
s.e.	0.23	0.59	0.78	0.94	1.15
unwt n	6022	6022	6022	6022	6022
Mostly B					
s.e.	0.34	0.51	1.00	0.97	1.12
unwt n	5232	5232	5232	5232	5232
Mostly C					
s.e.	0.35	0.67	1.28	1.26	1.41
unwt n	3041	3041	3041	3041	3041
Mostly D					
s.e.	0.58	0.85	1.89	3.34	3.16
unwt n	938	938	938	938	938
SCIENCE GRADES					
Mostly A					
s.e.	0.28	0.50	0.88	0.96	1.05
unwt n	5848	5848	5848	5848	5848
Mostly B					
s.e.	0.29	0.67	0.96	1.06	1.20
unwt n	5169	5169	5169	5169	5169
Mostly C					
s.e.	0.35	0.56	1.03	1.26	1.38
unwt n	2889	2889	2889	2889	2889
Mostly D					
s.e.	0.67	0.93	1.89	1.84	2.20
unwt n	915	915	915	915	915

TABLE A3.1
Standard Error of tenth graders making decisions on which classes, by selected background characteristics (continued)

	Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
ADVANCED MATH					
Low					
s.e.	0.36	1.01	1.14	1.48	1.53
unwt n	3333	3333	3333	3333	3333
Middle					
s.e.	0.26	0.36	0.73	0.76	0.94
unwt n	8023	8023	8023	8023	8023
Advanced					
s.e.	0.25	0.44	1.25	1.08	1.22
unwt n	4244	4244	4244	4244	4244
ADVANCED SCIENCE					
Low					
s.e.	0.75	2.80	1.87	1.76	2.89
unwt n	892	892	892	892	892
Middle					
s.e.	0.20	0.32	0.64	0.68	0.74
unwt n	11834	11834	11834	11834	11834
Advanced					
s.e.	0.45	0.70	1.41	1.52	2.03
unwt n	2854	2854	2854	2854	2854

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

TABLE A3.2
Decisions on Whether or Not To Go to College, by Background Characteristics

	Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
ADVANCED MATH TOTAL					
s.e.	0.32	0.32	0.62	0.56	0.64
unwt n	15607	15607	15607	15607	15607
SEX					
Male					
s.e.	0.47	0.52	0.91	0.79	0.94
unwt n	7565	7565	7565	7565	7565
Female					
s.e.	0.43	0.39	0.79	0.75	0.91
unwt n	8042	8042	8042	8042	8042
RACE					
Asian					
s.e.	1.37	1.74	2.02	1.75	2.55
unwt n	1030	1030	1030	1030	1030
Hispanic					
s.e.	1.38	0.79	2.11	1.80	1.75
unwt n	1708	1708	1708	1708	1708
Black					
s.e.	0.96	1.73	2.21	2.12	2.24
unwt n	1387	1387	1387	1387	1387
White					
s.e.	0.33	0.27	0.69	0.62	0.69
unwt n	11263	11263	11263	11263	11263
American Indian					
s.e.	1.80	8.91	4.78	2.86	5.20
unwt n	159	159	159	159	159

TABLE A3.2
Decisions on Whether or Not To Go to College, by Background Characteristics (continued)

	Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
FAMILY COMPOSITION					
Mother & Father					
s.e.	0.38	0.37	0.70	0.65	0.72
unwt n	10397	10397	10397	10397	10397
Father & Female Guar					
s.e.	1.73	2.27	2.11	3.14	3.67
unwt n	438	438	438	438	438
Father only					
s.e.	1.01	1.24	6.43	2.69	5.21
unwt n	438	438	438	438	438
Mother & Male Guar					
s.e.	0.92	0.68	1.70	2.10	2.11
unwt n	1728	1728	1728	1728	1728
Mother only					
s.e.	0.74	1.28	1.37	1.25	1.56
unwt n	2169	2169	2169	2169	2169
Other Adult					
s.e.	1.22	1.68	4.93	2.90	4.61
unwt n	381	381	381	381	381
SOCIOECONOMIC STATUS					
Lowest					
s.e.	0.50	0.86	1.25	1.05	1.41
unwt n	3029	3029	3029	3029	3029
Second s.e.	0.51	0.83	1.15	1.26	1.28
unwt n	3627	3627	3627	3627	3627
Third					
s.e.	0.53	0.50	1.08	1.12	1.20
unwt n	3775	3775	3775	3775	3775
Highest					
s.e.	0.74	0.50	1.30	1.00	1.13
unwt n	4769	4769	4769	4769	4769

TABLE A3.2
Decisions on Whether or Not To Go to College, by Background Characteristics (continued)

	Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
PARENTS EDUCATION					
Less than H.S.					
s.e.	0.67	1.06	1.69	1.49	2.06
unwt n	1210	1210	1210	1210	1210
H.S. Graduate					
s.e.	0.61	0.80	1.43	1.22	1.39
unwt n	2920	2920	2920	2920	2920
Some College					
s.e.	0.38	0.58	0.83	0.95	0.95
unwt n	5917	5917	5917	5917	5917
College Graduate					
s.e.	0.90	0.66	1.40	1.22	1.46
unwt n	2473	2473	2473	2473	2473
M.A./M.S.					
s.e.	1.05	0.77	2.06	1.54	2.24
unwt n	1574	1574	1574	1574	1574
Ph.D.					
s.e.	3.10	0.83	4.14	2.58	2.74
unwt n	986	986	986	986	986
MATH GRADES					
Mostly A					
s.e.	0.54	0.61	0.91	0.78	1.05
unwt n	6005	6005	6005	6005	6005
Mostly B					
s.e.	0.45	0.59	0.96	1.09	1.04
unwt n	5217	5217	5217	5217	5217
Mostly C					
s.e.	0.61	0.55	1.28	1.13	1.41
unwt n	3028	3028	3028	3028	3028
Mostly D					
s.e.	1.42	0.86	3.31	1.40	2.72
unwt n	934	934	934	934	934

TABLE A3.2
Decisions on Whether or Not To Go to College, by Background Characteristics (continued)

	Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
SCIENCE GRADES					
Mostly A					
s.e.	0.53	0.46	0.96	0.90	0.96
unwt n	5826	5826	5826	5826	5826
Mostly B					
s.e.	0.48	0.70	1.05	1.03	1.12
unwt n	5155	5155	5155	5155	5155
Mostly C					
s.e.	0.65	0.59	1.14	1.09	1.32
unwt n	2881	2881	2881	2881	2881
Mostly D					
s.e.	1.50	1.06	1.73	1.76	2.18
unwt n	914	914	914	914	914
EXPECTED SCHOOL LEVEL					
Less than H.S.					
s.e.	2.60	5.22	5.03	5.25	7.38
unwt n	85	85	85	85	85
H.S. Graduate					
s.e.	0.92	1.31	1.30	1.24	1.87
unwt n	1293	1293	1293	1293	1293
Trade School					
s.e.	0.56	0.56	1.29	1.86	1.87
unwt n	1710	1710	1710	1710	1710
Some College					
s.e.	0.66	0.77	1.51	1.42	1.44
unwt n	2474	2474	2474	2474	2474
College Graduate					
s.e.	0.47	0.51	1.06	0.89	1.05
unwt n	5131	5131	5131	5131	5131
M.A./Ph.D.					
s.e.	0.71	0.69	1.17	1.01	1.21
unwt n	4779	4779	4779	4779	4779

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

TABLE A3.3
Discussions with parents about preparations for ACT/SAT

		Often	Sometimes	Never
TOTAL	s.e.	0.77	0.69	0.41
	unwt n	15839	15839	15839
SEX				
Male	s.e.	1.03	0.96	0.61
	unwt n	7691	7691	7691
Female	s.e.	0.95	0.89	0.53
	unwt n	8148	8148	8148
RACE				
Asian	s.e.	2.76	2.57	1.45
	unwt n	1045	1045	1045
Hispanic	s.e.	2.50	2.21	0.87
	unwt n	1732	1732	1732
Black	s.e.	2.54	2.40	1.98
	unwt n	1406	1406	1406
White	s.e.	0.84	0.75	0.41
	unwt n	11431	11431	11431
American Indian	s.e.	7.20	4.02	7.62
	unwt n	160	160	160
FAMILY COMPOSITION				
Mother & Father	s.e.	0.87	0.76	0.55
	unwt n	10538	10538	10538
Father & Female Guar	s.e.	3.26	3.24	1.12
	unwt n	450	450	450
Father only	s.e.	5.49	5.58	1.09
	unwt n	452	452	452
Mother & Male Guar	s.e.	2.21	2.14	1.30
	unwt n	1745	1745	1745
Mother only	s.e.	1.84	1.78	0.75
	unwt n	2200	2200	2200
Other Relative	s.e.	4.98	5.01	1.63
	unwt n	397	397	397

TABLE A3.3
Discussions with parents about preparation for ACT/SAT
(continued)

		Often	Sometimes	Never
SOCIOECONOMIC STATUS				
Lowest	s.e.	1.43	1.26	0.86
	unwt n	3086	3086	3086
Second	s.e.	1.42	1.43	0.50
	unwt n	3663	3663	3663
Third	s.e.	1.33	1.21	0.96
	unwt n	3821	3821	3821
Highest	s.e.	1.32	1.24	0.91
	unwt n	4853	4853	4853
PARENTAL EDUCATION				
Less than H.S.	s.e.	2.36	2.19	0.79
	unwt n	1238	1238	1238
H.S. Graduate	s.e.	1.43	1.35	0.85
	unwt n	2964	2964	2964
Some College	s.e.	1.05	1.00	0.60
	unwt n	5985	5985	5985
College Graduate	s.e.	1.55	1.49	1.04
	unwt n	2507	2507	2507
M.A.	s.e.	1.89	2.17	2.31
	unwt n	1604	1604	1604
Ph.D.	s.e.	2.97	3.40	1.54
	unwt n	1002	1002	1002
MATH GRADES				
Mostly A	s.e.	1.04	1.07	0.69
	unwt n	6067	6067	6067
Mostly B	s.e.	1.24	1.08	0.78
	unwt n	5309	5309	5309
Mostly C	s.e.	1.43	1.39	0.52
	unwt n	3097	3097	3097
Mostly D	s.e.	3.00	3.08	0.85
	unwt n	944	944	944

TABLE A3.3
Discussions with parents about preparation for ACT/SAT
(continued)

		Often	Sometimes	Never
SCIENCE GRADES				
Mostly A	s.e.	1.09	1.02	0.78
	unwt n	5903	5903	5903
Mostly B	s.e.	1.26	1.18	0.64
	unwt n	5236	5236	5236
Mostly C	s.e.	1.35	1.28	0.81
	unwt n	2928	2928	2928
Mostly D	s.e.	1.96	1.86	0.90
	unwt n	932	932	932
EXPECTED GOAL IN HS				
Less than H.S.	s.e.	6.36	4.83	4.89
	unwt n	90	90	90
H.S. Graduate	s.e.	1.77	1.44	1.24
	unwt n	1318	1318	1318
Trade School	s.e.	1.95	1.96	0.56
	unwt n	1729	1729	1729
Some College	s.e.	1.63	1.59	0.56
	unwt n	2496	2496	2496
College Graduate	s.e.	1.09	1.10	0.67
	unwt n	5242	5242	5242
M.A./Ph.D.	s.e.	1.27	1.21	0.99
	unwt n	4827	4827	4827

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

TABLE A3.4
Process of Making Decision on whether or not to Have a Job, selected by Background Characteristics.

		Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
TOTAL	s.e.	0.23	0.46	0.54	0.55	0.64
	unwt n	15610	15610	15610	15610	15610
SEX						
Male						
	s.e.	0.30	0.77	0.75	0.84	0.93
	unwt n	7572	7572	7572	7572	7572
Female	s.e.	0.32	0.50	0.75	0.74	0.84
	unwt n	8038	8038	8038	8038	8038
RACE						
Asian	s.e.	1.26	1.68	2.11	2.12	2.40
	unwt n	1031	1031	1031	1031	1031
Hispanic	s.e.	0.88	1.08	1.80	1.69	1.82
	unwt n	1707	1707	1707	1707	1707
Black	s.e.	0.79	1.70	2.43	2.22	2.43
	unwt n	1396	1396	1396	1396	1396
White	s.e.	0.25	0.50	0.60	0.60	0.72
	unwt n	11257	11257	11257	11257	11257
Amer Indian	s.e.	1.66	9.03	3.36	2.77	8.43
	unwt n	159	159	159	159	159
FAMILY COMPOSITION						
Mother & Father						
	s.e.	0.30	0.53	0.58	0.60	0.73
	unwt n	10392	10392	10392	10392	10392
Father & Other Fem						
	s.e.	0.92	3.11	3.10	2.079	3.79
	unwt n	437	437	437	437	437
Father Only						
	s.e.	0.81	6.33	5.05	3.04	5.24
	unwt n	435	435	435	435	435

TABLE A3.4
Process of Making Decision on whether or not to Have a Job, selected by Background Characteristics (continued)

		Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
Mother & Other Mal						
	s.e.	0.65	0.71	2.04	2.18	1.98
	unwt n	1731	1731	1731	1731	1731
Mother only						
	s.e.	0.53	1.34	1.29	1.20	1.54
	unwt n	2174	2174	2174	2174	2174
Other Adult						
	s.e.	1.42	1.98	3.33	4.94	4.49
	unwt n	385	385	385	385	385
SOCIOECONOMIC STATUS						
Lowest	s.e.	0.63	0.90	1.17	1.08	1.27
	unwt n	3034	3034	3034	3034	3034
Second	s.e.	0.45	0.87	0.99	1.32	1.21
	unwt n	3624	3624	3624	3624	3624
Third	s.e.	0.40	0.74	1.12	0.99	1.22
	unwt n	3771	3771	3771	3771	3771
Highest	s.e.	0.43	1.12	0.96	1.00	1.17
	unwt n	4771	4771	4771	4771	4771
NOT EMPLOYED						
Not Employed						
	s.e.	0.28	0.60	0.64	0.65	0.73
	unwt n	1154	1154	1154	1154	11545
JOB TYPE						
Lawn Worker	s.e.	1.09	5.26	3.22	3.09	3.14
	unwt n	579	579	579	579	579
Fast Food/Waiter						
	s.e.	0.48	0.83	1.26	1.48	1.63
	unwt n	1925	1925	1925	1925	1925
Paper Route						
	s.e.	1.69	1.98	3.85	4.12	4.04
	unwt n	181	181	181	181	181

TABLE A3.4
Process of Making Decision on whether or not to Have a Job, selected by Background Characteristics
(continued)

		Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
Babysitter						
	s.e.	0.80	1.37	1.96	2.82	2.43
	unwt n	919	919	919	919	919
Camp Counselor						
	s.e.	1.04	11.81	5.38	4.25	5.84
	unwt n	201	201	201	201	201
Farm Worker						
	s.e.	1.60	1.62	3.13	2.22	3.40
	unwt n	420	420	420	420	420
Fact/Man/Const						
	s.e.	1.06	1.16	1.83	1.92	2.31
	unwt n	739	739	739	739	739
Store Clerk						
	s.e.	0.62	0.96	2.31	2.41	2.39
	unwt n	963	963	963	963	963
House Cleaning						
	s.e.	3.17	2.60	4.88	5.62	5.75
	unwt n	97	97	97	97	97
Office/Cleaning						
	s.e.	1.27	1.03	3.15	3.32	4.20
	unwt n	437	437	437	437	437
Hospital/Health						
	s.e.	2.72	2.35	6.93	6.39	8.14
	unwt n	64	64	64	64	64
Other	s.e.	0.52	0.65	1.78	1.58	1.71
	unwt n	2076	2076	2076	2076	2076

TABLE A3.4
Process of Making Decision on whether or not to Have a Job, selected by Background Characteristics (continued)

	Parents Decide	Parents Discuss	Together	Student Discuss	Student Decide
HOURS/PER WEEK					
0-10 hours					
s.e.	0.43	0.68	1.16	1.38	1.48
unwt n	2788	2788	2788	2788	2788
11-20 hours					
s.e.	0.46	1.07	1.18	1.22	1.37
unwt n	2849	2849	2849	2849	2849
21-30 hours					
s.e.	0.49	0.79	2.12	1.78	1.97
unwt n	1692	1692	1692	1692	1692
32-40 hours					
s.e.	0.90	0.73	1.62	2.04	2.19
unwt n	1064	1064	1064	1064	1064
Over 40 hours					
s.e.	1.29	5.89	2.73	2.37	4.23
unwt n	485	485	485	485	485

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

TABLE A3.5
Parental Limits to Spending Time With Friends

		Often	Sometimes	Rarely	Never
TOTAL	s.e.	0.59	0.57	0.48	0.45
	unwt n	16055	16055	16055	16055
SEX					
Male	s.e.	0.88	0.88	0.73	0.58
	unwt n	7799	7799	7799	7799
Female	s.e.	0.82	0.79	0.64	0.69
	unwt n	8256	8256	8256	8256
RACE					
Asian	s.e.	2.47	2.05	2.42	1.42
	unwt n	1061	1061	1061	1061
Hispanic	s.e.	1.72	1.65	1.46	1.12
	unwt n	1785	1785	1785	1785
Black	s.e.	2.32	1.69	2.29	1.46
	unwt n	1421	1421	1421	1421
White	s.e.	0.66	0.70	0.49	0.53
	unwt n	11556	11556	11556	11556
American Indian	s.e.	4.02	6.98	4.64	3.26
	unwt n	163	163	163	163
FAMILY COMPOSITION					
Mother & Father	s.e.	0.74	0.72	0.53	0.51
	unwt n	10670	10670	10670	10670
Father & Other Fem	s.e.	3.56	3.17	3.49	2.40
	unwt n	454	454	454	454
Father only	s.e	3.12	5.60	4.78	4.61
	unwt n	456	456	456	456
Mother & Other Male	s.e.	1.98	1.70	1.25	1.14
	unwt n	1783	1783	1783	1783
Mother only	s.e.	1.28	1.37	1.56	1.25
	unwt n	2226	2226	2226	2226
Other Adult	s.e.	3.17	4.52	2.81	4.14
	unwt n	408	408	408	408

TABLE A3.5
Parental Limits to Spending Time With Friends
(continued)

		Often	Sometimes	Rarely	Never
SOCIOECONOMIC STATUS					
Lowest	s.e.	1.32	1.24	1.16	1.33
	unwt n	3154	3154	3154	3154
Middle	s.e.	1.32	1.27	1.03	0.88
	unwt n	3685	3685	3685	3685
Third	s.e.	1.22	1.08	1.00	0.89
	unwt n	3896	3896	3896	3896
Highest	s.e.	1.15	1.22	0.79	0.69
	unwt n	4902	4902	4902	4902
PARENT EDUCATION					
Less than H.S.	s.e.	2.07	1.75	1.52	2.76
	unwt n	1272	1272	1272	1272
H.S. Graduate	s.e.	1.39	1.40	1.15	1.03
	unwt n	2989	2989	2989	2989
Some College	s.e.	0.97	0.90	0.80	0.61
	unwt n	6073	6073	6073	6073
College Graduate	s.e.	1.40	1.30	1.17	1.07
	unwt n	2545	2545	2545	2545
M.A.	s.e.	2.06	1.85	1.53	1.04
	unwt n	1619	1619	1619	1619
Ph.D.	s.e.	3.11	3.96	1.88	1.56
	unwt n	1013	1013	1013	1013

TABLE A3.5
Parental Limits to Spending Time With Friends
(continued)

		Often	Sometimes	Rarely	Never
MATH GRADES					
Mostly A	s.e.	0.86	0.90	0.84	0.64
	unwt n	6129	6129	6129	6129
Mostly B	s.e.	1.16	1.03	0.85	0.88
	unwt n	5385	5385	5385	5385
Mostly C	s.e.	1.18	1.29	1.07	0.98
	unwt n	3151	3151	3151	3151
Mostly D	s.e.	2.56	3.02	1.70	1.75
	unwt n	954	954	954	954
SCIENCE GRADES					
Mostly A	s.e.	0.94	1.00	0.84	0.54
	unwt n	5975	5975	5975	5975
Mostly B	s.e.	1.13	1.14	0.89	0.98
	unwt n	5307	5307	5307	5307
Mostly C	s.e.	1.27	1.22	0.92	1.02
	unwt n	2984	2984	2984	2984
Mostly D	s.e.	2.20	2.05	1.54	1.44
	unwt n	936	936	936	936

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

TABLE A3.6
Parents Checking Homework

		Often	Sometimes	Rarely	Never
TOTAL	s.e.	0.56	0.56	0.54	0.50
	unwt n	16177	16177	16177	16177
SEX					
Male	s.e.	0.81	0.88	0.79	0.66
	unwt n	7865	7865	7865	7865
Female	s.e.	0.72	0.74	0.67	0.74
	unwt n	8312	8312	8312	8312
RACE					
Asian	s.e.	2.42	2.27	2.43	1.52
	unwt n	1071	1071	1071	1071
Hispanic	s.e.	2.31	1.57	1.81	1.51
	unwt n	1795	1795	1795	1795
Black	s.e.	2.11	2.00	2.02	1.84
	unwt n	1448	1448	1448	1448
White	s.e.	0.60	0.66	0.63	0.57
	unwt n	11628	11628	11628	11628
American Indian	s.e.	6.97	3.53	4.97	3.65
	unwt n	165	165	165	165
FAMILY COMPOSITION					
Mother & Father	s.e.	0.69	0.64	0.65	0.57
	unwt n	10738	10738	10738	10738
Father & Other Fem	s.e.	3.15	2.85	3.84	2.63
	unwt n	454	454	454	454
Father only	s.e.	2.55	5.62	3.89	5.31
	unwt n	460	460	460	460
Mother & Other Male	s.e.	1.78	1.99	1.68	1.22
	unwt n	1796	1796	1796	1796
Mother only	s.e.	1.50	1.27	1.49	1.32
	unwt n	2256	2256	2256	2256
Other Adult	s.e.	3.08	4.83	2.96	4.06
	unwt n	414	414	414	414

TABLE A3.6
Parents Checking Homework
(continued)

		Often	Sometimes	Rarely	Never
SOCIOECONOMIC STATUS					
Lowest	s.e.	1.19	1.17	1.16	1.53
	unwt n	3175	3175	3175	3175
Second	s.e.	1.04	1.26	1.18	0.98
	unwt n	3735	3735	3735	3735
Third	s.e.	1.23	1.03	1.10	0.89
	unwt n	3908	3908	3908	3908
Highest	s.e.	1.01	1.27	0.91	0.64
	unwt n	4928	4928	4928	4928
PARENT EDUCATION					
Less than H.S.	s.e.	1.93	1.98	1.81	2.73
	unwt n	1276	1276	1276	1276
H.S. Graduate	s.e.	1.23	1.23	1.20	1.24
	unwt n	3022	3022	3022	3022
Some College	s.e.	0.80	0.87	0.84	0.71
	unwt n	6122	6122	6122	6122
College Graduate	s.e.	1.43	1.23	1.21	0.89
	unwt n	2553	2553	2553	2553
M.A.	s.e.	1.85	1.92	1.56	1.04
	unwt n	1624	1624	1624	1624
Ph.D.	s.e.	2.93	4.11	2.13	1.84
	unwt n	1024	1024	1024	1024
MATH GRADES					
Mostly A	s.e.	0.92	0.88	0.89	0.70
	unwt n	6174	6174	6174	6174
Mostly B	s.e.	0.95	1.10	0.89	0.96
	unwt n	5435	5435	5435	5435
Mostly C	s.e.	1.16	1.26	1.27	0.92
	unwt n	3167	3167	3167	3167
Mostly D	s.e.	1.66	3.08	2.15	2.37
	unwt n	958	958	958	958

TABLE A3.6
Parents Checking Homework
(continued)

		Often	Sometimes	Rarely	Never
SCIENCE GRADES					
Mostly A	s.e.	1.03	0.95	0.83	0.82
	unwt n	6012	6012	6012	6012
Mostly B	s.e.	0.99	1.19	1.08	0.95
	unwt n	5351	5351	5351	5351
Mostly C	s.e.	1.14	1.19	1.16	1.02
	unwt n	3003	3003	3003	3003
Mostly D	s.e.	1.86	1.94	1.92	1.93
	unwt n	946	946	946	946

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

TABLE 3.7
Parental Limits Set for Watching TV and Video Games

		Often	Sometimes	Rarely	Never
TOTAL	se	0.38	0.56	0.57	0.68
	unwt n	16047	16047	16047	16047
SEX					
Male	se	0.54	0.81	0.88	0.933
	unwt n	7802	7802	7802	7802
Female	se	0.54	0.68	0.69	0.904
	unwt n	8245	8245	8245	8245
RACE					
Asian	se	1.79	2.18	2.46	2.33
	unwt n	1061	1061	1061	1061
Hispanic	se	0.94	2.08	1.49	2.33
	unwt n	1780	1780	1780	1780
Black	se	1.08	2.16	2.00	2.33
	unwt n	1422	1422	1422	1422
White	se	0.47	0.58	0.66	0.78
	unwt n	11554	11554	11554	11554
American Indian	se	2.39	8.22	4.41	5.94
	unwt n	162	162	162	162
FAMILY COMPOSITION					
Mother & Father	se	0.50	0.65	0.67	0.76
	unwt n	10666	10666	10666	10666
Father & Other Fem	se	2.49	2.51	3.61	3.46
	unwt n	454	454	454	454
Father only	se	1.39	5.87	3.13	5.47
	unwt n	456	456	456	456
Mother & Other Mal	se	1.13	1.67	1.77	2.11
	unwt n	1780	1780	1780	1780
Mother only	se	0.82	1.06	1.52	1.63
	unwt n	2226	2226	2226	2226
Other Adult	se	1.61	2.71	4.68	4.44
	unwt n	407	407	407	407

TABLE 3.7
Parental Limits Set for Watching TV and Video Games
(continued)

		Often	Sometimes	Rarely	Never
SOCIOECONOMIC STATUS					
Lowest	s.e.	0.67	1.11	1.09	1.45
	unwt n	3151	3151	3151	3151
Second	s.e.	0.51	1.20	1.26	1.34
	unwt n	3684	3684	3684	3684
Third	s.e.	0.76	0.87	1.12	1.26
	unwt n	3888	3888	3888	3888
Highest	s.e.	0.88	1.17	1.04	1.12
	unwt n	4902	4902	4902	4902
PARENT EDUCATION					
Less than H.S.	s.e.	1.08	1.48	1.67	2.46
	unwt n	1268	1268	1268	1268
H.S. Graduate	s.e.	0.56	1.13	1.28	1.45
	unwt n	2990	2990	2990	2990
Some College	s.e.	0.57	0.85	0.84	0.99
	unwt n	6068	6068	6068	6068
College Graduate	s.e.	0.91	1.16	1.50	1.40
	unwt n	2543	2543	2543	2543
M.A.	s.e.	1.89	1.61	1.62	1.82
	unwt n	1618	1618	1618	1618
Ph.D.	s.e.	1.91	3.96	3.17	2.58
	unwt n	1013	1013	1013	1013
MATH GRADES					
Mostly A	s.e.	0.57	0.77	0.97	0.96
	unwt n	6128	6128	6128	6128
Mostly B	s.e.	0.77	1.00	0.88	1.18
	unwt n	5384	5384	5384	5384
Mostly C	s.e.	0.73	1.00	1.26	1.43
	unwt n	3147	3147	3147	3147
Mostly D	s.e.	1.36	3.17	2.01	2.77
	unwt n	952	952	952	952

TABLE 3.7
Parental Limits Set for Watching TV and Video Games
(continued)

		Often	Sometimes	Rarely	Never
SCIENCE GRADES					
Mostly A	se	0.60	0.87	0.94	1.08
	unwt n	5977	5977	5977	5977
Mostly B	se	0.74	1.09	1.03	1.21
	unwt n	5303	5303	5303	5303
Mostly C	se	0.77	0.98	1.19	1.38
	unwt n	2981	2981	2981	2981
Mostly D	se	0.94	1.94	1.72	2.19
	unwt n	932	932	932	932

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A3.8
Occupational Distribution by Background Characteristics

		Never employed	Lawn work/ odd jobs	Fast Food/ Waiter(ess)	Paper route	Baby-sitter	Factory Camp Counselor	Farm Worker	Manual & const	Store Clerk	House cleaning	Office/ Clerical	Hospital/ Health	Other Job
TOTAL														
	s.e.	0.68	0.30	0.45	0.10	0.29	0.20	0.23	0.24	0.32	0.08	0.20	0.06	0.48
	unwt n	1595	15951	15951	15951	1595	15951	15951	15951	15951	15951	15951	15951	15951
SEX														
Male														
	s.e.	0.90	0.60	0.59	0.18	0.35	0.38	0.42	0.45	0.48	0.06	0.22	0.09	0.66
	unwt n	7783	7783	7783	7783	7783	7783	7783	7783	7783	7783	7783	7783	7783
Female														
	s.e.	0.89	0.08	0.62	0.08	0.48	0.14	0.14	0.13	0.43	0.15	0.33	0.09	0.66
	unwt n	8168	8168	8168	8168	8168	8168	8168	8168	8168	8168	8168	8168	8168
RACE														
Asian														
	s.e.	2.66	0.90	1.43	0.28	0.63	0.68	0.16	1.18	1.68	0.18	1.22	0.10	2.17
	unwt n	1057	1057	1057	057	1057	1057	1057	1057	1057	1057	1057	1057	1057
Hispanic														
	s.e.	1.75	0.32	1.31	0.24	0.76	0.36	0.31	0.65	0.96	0.46	0.48	0.12	1.12
	unwt n	1787	1787	1787	1787	1787	1787	1787	1787	1787	1787	1787	1787	1787
Black														
	s.e.	2.44	0.37	1.46	0.09	1.05	0.40	0.19	0.71	0.74	0.34	0.73	0.40	2.19
	unwt n	1440	1440	1440	1440	1440	1440	1440	1440	14440	1440	1440	1440	1440
White														
	s.e.	0.80	0.40	0.53	0.12	0.34	0.26	0.30	0.28	0.38	0.08	0.24	0.06	0.52
	unwt n	11443	11443	11443	11443	11443	11443	11443	11443	11443	11443	11443	11443	11443
American Indian														
	s.e.	6.96	1.49	3.32	0.52	1.82	0.54	1.50	1.44	3.19	1.50	1.98	0.00	3.66
	unwt n	156	156	156	156	156	156	156	156	156	156	156	156	156
FAMILY COMPOSITION														
Mother & Father														
	s.e.	0.82	0.30	0.50	0.13	0.26	0.31	0.29	0.30	0.41	0.08	0.22	0.08	0.51
	unwt n	10572	10572	10572	10572	10572	10572	10572	10572	10572	10572	10572	10572	10572
Father & Other Fem														
	s.e.	3.57	0.64	2.89	0.29	1.65	0.35	1.65	1.82	0.88	0.33	0.62	0.29	2.94
	unwt n	455	455	455	455	455	455	455	455	455	455	455	455	455

Table A3.8
Occupational Distribution by Background Characteristics (continued)

	Never employed	Lawn work/ odd jobs	Fast Food/ Waiter(ess)	Paper route	Baby-sitter	Camp Counselor	Farm Worker	Factory Manual & const	Store Clerk	House cleaning	Office/ Clerical	Hospital/ Health	Other Job
Father only													
s.e.	5.08	6.22	1.76	0.29	0.76	0.79	1.12	0.78	1.08	0.58	1.19	0.00	5.00
unwt n	450	450	450	450	450	450	450	450	450	450	450	450	450
Mother & Other Male													
s.e.	2.05	0.72	1.32	0.24	0.76	0.40	0.49	0.61	1.04	0.30	0.60	0.15	1.73
unwt n	1780	1780	1780	1780	1780	1780	1780	1780	1780	1780	1780	1780	1780
Mother only													
s.e.	1.70	0.45	1.17	0.23	0.85	0.20	0.33	0.57	0.68	0.26	0.73	0.14	1.02
unwt n	2219	2219	2219	2219	2219	2219	2219	2219	2219	2219	2219	2219	2219
Other Adult													
s.e.	3.73	1.16	3.09	0.36	4.92	0.56	0.62	1.16	2.25	0.17	1.11	0.55	3.37
unwt n	407	407	407	407	407	407	407	407	407	407	407	407	407
SOCIOECONOMIC STATUS													
Lowest													
s.e.	1.52	0.43	1.03	0.12	0.47	0.11	0.48	0.44	0.61	0.22	0.35	0.14	0.14
unwt n	3129	3129	3129	3129	3129	3129	3129	3129	3129	3129	3129	3129	3129
Second													
s.e.	1.39	0.44	0.82	0.20	0.78	0.12	0.50	0.46	0.52	0.16	0.48	0.12	0.94
unwt n	3668	3668	3668	3668	3668	3668	3668	3668	3668	3668	3668	3668	3668
Third													
s.e.	1.27	0.32	0.83	0.17	0.64	0.31	0.37	0.52	0.73	0.15	0.41	0.13	1.04
unwt n	7526	7526	7526	7526	7526	7526	7526	7526	7526	7526	7526	7526	7526
Highest													
s.e.	1.31	0.95	0.76	0.24	0.45	0.67	0.29	0.41	0.66	0.11	0.33	0.12	0.78
unwt n	4875	4875	4875	4875	4875	4875	4875	4875	4875	4875	4875	4875	4875
HOURS/PER WEEK													
0-10 hours													
s.e.	0.00	0.82	1.11	0.50	1.24	0.35	0.40	0.59	0.72	0.39	0.63	0.18	1.37
unwt n	2811	2811	2811	2811	2811	2811	2811	2811	2811	2811	2811	2811	2811
11-20 hours													
s.e.	0.00	0.64	1.30	0.17	0.58	0.93	0.60	0.63	1.05	0.14	0.46	0.20	1.23
unwt n	2929	2929	2929	2929	2929	2929	2929	2929	2929	2929	2929	2929	2929

Table A3.8
Occupational Distribution by Background Characteristics (continued)

	Never employed	Lawn work/ odd jobs	Fast Food/ Waiter(ess)	Paper route	Baby-sitter	Camp Counselor	Farm Worker	Factory Manual & const	Store Clerk	House cleaning	Office/ Clerical	Hospital/ Health	Other Job
21-30 hours													
s.e.	0.00	0.51	1.64	0.11	0.81	0.40	0.60	0.86	1.47	0.12	0.68	0.34	2.02
unwt n	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
31-40 hours													
s.e.	0.00	0.89	2.05	0.07	0.89	0.76	1.02	1.36	1.29	0.45	1.54	0.17	1.64
unwt n	1090	1090	1090	1090	1090	1090	1090	1090	1090	1090	1090	1090	1090
Over 40 hours													
s.e.	0.00	5.95	2.98	0.05	1.55	1.09	2.71	2.45	0.64	0.44	0.60	0.41	2.87
unwt n	496	496	496	496	496	496	496	496	496	496	496	496	496
WAGES/PER HOUR													
Less than $3.35													
s.e.	0.00	0.56	1.41	0.58	1.99	0.58	0.86	0.52	0.62	0.32	0.71	0.12	1.32
unwt n	1749	1749	1749	1749	1749	1749	1749	1749	1749	1749	1749	1749	1749
$3.35-$3.99													
s.e.	0.00	0.41	1.42	0.17	0.41	0.31	0.34	0.65	1.02	0.22	0.59	0.14	1.35
unwt n	2713	2713	2713	2713	2713	2713	2713	2713	2713	2713	2713	2713	2713
$4.00-$4.99													
s.e.	0.00	1.28	1.39	0.29	0.55	1.04	0.77	0.71	1.09	0.15	0.68	0.14	1.47
unwt n	2584	2584	2584	2584	2584	2584	2584	2584	2584	2584	2584	2584	2584
Over $4.99													
s.e.	0.00	1.21	1.37	0.29	0.84	0.40	0.79	1.32	1.72	0.52	0.99	0.40	2.05
unwt n	1451	1451	1451	1451	1451	1451	1451	1451	1451	1451	1451	1451	1451
MATH GRADES													
Mostly A													
s.e.	0.97	0.42	0.64	0.20	0.37	0.20	0.31	0.36	0.54	0.13	0.34	0.11	0.82
unwt n	6108	6108	6108	6108	6108	6108	6108	6108	6108	6108	6108	6108	6108
Mostly B													
s.e.	1.18	0.26	0.75	0.15	0.48	0.54	0.33	0.42	0.55	0.08	0.28	0.08	0.82
unwt n	5348	5348	5348	5348	5348	5348	5348	5348	5348	5348	5348	5348	5348

Table A3.8
Occupational Distribution by Background Characteristics (continued)

	Never employed	Lawn work/ odd jobs	Fast Food/ Waiter(ess)	Paper route	Baby-sitter	Camp Counselor	Farm Worker	Factory Manual & const	Store Clerk	House cleaning	Office/ Clerical	Hospital/ Health	Other Job
Mostly C													
s.e.	1.34	0.57	0.97	0.15	0.93	0.16	0.48	0.46	0.69	0.21	0.43	0.16	1.00
unwt n	3121	3121	3121	3121	3121	3121	3121	3121	3121	3121	3121	3121	3121
Mostly D													
s.e.	2.49	3.19	1.90	0.19	0.87	0.26	0.83	0.80	0.89	0.56	1.17	0.34	1.60
unwt n	948	948	948	948	948	948	948	948	948	948	948	948	948
SCIENCE GRADES													
Mostly A													
s.e.	1.12	0.34	0.67	0.18	0.44	0.24	0.37	0.34	0.58	0.10	0.34	0.10	0.87
unwt n	5944	5944	5944	5944	5944	5944	5944	5944	5944	5944	5944	5944	5944
Mostly B													
s.e.	1.25	0.70	0.80	0.16	0.40	0.54	0.34	0.42	0.48	0.14	0.25	0.11	0.86
unwt n	5266	5266	5266	5266	5266	5266	5266	5266	5266	5266	5266	5266	5266
Mostly C													
s.e.	1.35	0.68	0.98	0.16	0.61	0.21	0.38	0.54	0.76	0.20	0.58	0.09	0.93
unwt n	2959	2959	2959	2959	2959	2959	2959	2959	2959	2959	2959	2959	2959
Mostly D													
s.e.	2.26	0.72	1.78	0.32	0.82	0.11	0.78	0.81	1.28	0.29	0.41	0.55	1.41
unwt n	932	932	932	932	932	932	932	932	932	932	932	932	932
SOCIOECONOMIC STATUS													
Lowest													
s.e.	1.49	1.12	1.00	0.16	0.48	0.15	0.39	0.56	0.58	0.18	0.34	0.11	1.15
unwt n	2915	2915	2915	2915	2915	291	915	2915	2915	2915	2915	2915	2915
25-49%													
s.e.	1.35	0.49	0.92	0.15	0.85	0.24	0.38	0.43	0.54	0.18	0.41	0.09	0.90
unwt n	3638	3638	3638	3638	3638	3638	3638	3638	3638	3638	3638	3638	3638
50-75%													
s.e.	1.20	0.41	0.75	0.17	0.56	0.20	0.38	0.43	0.58	0.11	0.39	0.13	1.06
unwt n	3973	3973	3973	3973	3973	3973	3973	3973	3973	3973	3973	3973	3973
Highest													
s.e.	1.16	0.38	0.80	0.26	0.45	0.69	0.47	0.46	0.62	0.13	0.42	0.09	0.80
unwt n	4662	4662	4662	4662	4662	4662	4662	4662	4662	4662	4662	4662	4662

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A.F3.2: Standard Errors and Sample Sizes For Figure 3.2, Average Hours Per Week Spent By 1990 Tenth Graders On Five Out-of-School Activities

TELEVISION	
Estimate (hours):	18.34
Standard Error:	0.16
Unweighted N:	16419
EMPLOYMENT	
Estimate (hours):	10.65
Standard Error:	0.18
Unweighted N:	16241
OUTSIDE READING.	
Estimate (hours):	02.28
Standard Error:	0.03
Unweighted N:	17184
HOMEWORK:	
Estimate (hours):	04.25
Standard Error:	0.06
Unweighted N:	17065
EXTRACURRICULAR ACTIVITIES:	
Estimate (hours):	03.34
Standard Error:	0.07
Unweighted N:	17130

Source: National Education Longitudinal Study of 1988 (NELS:88) First Follow-Up, National Center for Education Statistics, U.S. Department of Education.

Table A.F3.3: Standard Errors and Sample Sizes for Figure 3.3, Average Hours Per Week Spent by 1990 Tenth Graders on Out of School Activities, by Science Grades

	ESTIMATE	S.E.	UNWTED N
TELEVISION			
Total	18.34	0.16	16419
Mostly A's	16.63	0.28	3082
Half A's, half B's	17.15	0.31	3017
Mostly B's	17.99	0.38	2785
Half B's, half C's	19.16	0.45	2705
Mostly C's	19.45	0.38	1898
Half C's, half D's	19.65	0.45	1184
Mostly D's	20.49	0.58	620
Mostly below D	20.20	0.86	335
EMPLOYMENT			
Total	10.65	0.18	16241
Mostly A's	9.58	0.31	3038
Half A's, half B's	10.27	0.39	2992
Mostly B's	10.12	0.36	2723
Half B's, half C's	10.84	0.56	2636
Mostly C's	11.55	0.45	1842
Half C's, half D's	12.01	0.54	1186
Mostly D's	12.23	0.72	612
Mostly below D	12.10	1.00	339
OUTSIDE READING			
Total	2.28	0.03	17184
Mostly A's	2.59	0.06	3158
Half A's, half B's	2.33	0.05	3116
Mostly B's	2.26	0.06	2876
Half B's, half C's	2.21	0.07	2812
Mostly C's	2.21	0.08	1976
Half C's, half D's	2.17	0.11	1264
Mostly D's	2.08	0.11	662
Mostly below D	2.02	0.17	362
HOMEWORK			
Total	4.25	0.06	17065
Mostly A's	5.65	0.13	3141
Half A's, half B's	5.08	0.16	3106
Mostly B's	4.44	0.11	2870
Half B's, half C's	3.66	0.11	2801
Mostly C's	3.62	0.12	1962
Half C's, half D's	3.22	0.14	1260
Mostly D's	2.69	0.15	650
Mostly below D	2.14	0.17	360

Table A.F3.3 Continued: Standard Errors and Sample Sizes for Figure 3.3, Average Hours Per Week Spent by 1990 Tenth Graders on Out of School Activities, by Science Grades

	ESTIMATE	S.E.	UNWTED N
EXTRACURRICULAR ACTIVITIES			
Total	3.34	0.07	17130
Mostly A's	4.79	0.15	3151
Half A's, half B's	4.08	0.17	3104
Mostly B's	3.34	0.13	2865
Half B's, half C's	2.86	0.14	2809
Mostly C's	2.81	0.16	1970
Half C's, half D's	2.26	0.18	1261
Mostly D's	1.63	0.18	656
Mostly below D	1.53	0.41	359

Source: National Education Longitudinal Study of 1988 (NELS:88) First Follow-Up (1990) Survey, National Center for Education Statistics, United States Department of Education.

TABLE A4.1. Responses to the question "How Sure Are You That You Will Graduate From High School?"

		Very sure I'll graduate	I'll probably graduate	I probably won't graduate	Very sure I'll graduate
TOTAL	s.e.	0.46	0.45	0.08	0.12
	unwt n	17523	17523	17523	17523
SEX					
Male	s.e.	0.66	0.63	0.11	0.15
	unwt n	8734	8734	8734	8734
Female	s.e.	0.58	0.55	0.11	0.19
	unwt n	8789	8789	8789	8789
RACE					
Asian	s.e.	1.92	1.87	0.35	0.39
	unwt n	1161	1161	1161	1161
Hispanic	s.e.	1.82	1.88	0.47	0.17
	unwt n	2133	2133	2133	2133
Black	s.e.	1.20	1.07	0.29	0.35
	unwt n	1713	1713	1713	1713
White	s.e.	0.49	0.47	0.07	0.14
	unwt n	12234	12234	12234	12234
American Indian	s.e.	4.00	3.99	0.47	1.21
	unwt n	193	193	193	193
PARENTS EDUCATION					
Less than H.S.	s.e.	1.64	1.60	0.33	0.36
	unwt n	1500	1500	1500	1500
H.S. Graduate	s.e.	1.09	1.03	0.18	0.34
	unwt n	3269	3269	3269	3269
Some College	s.e.	0.61	0.58	0.14	0.18
	unwt n	6605	6605	6605	6605
College Graduate	s.e.	0.75	0.73	0.07	0.09
	unwt n	2695	2695	2695	2695
Advanced Degree	s.e.	1.05	1.03	0.05	0.21
	unwt n	2773	2773	2773	2773

TABLE A4.1. Responses to the question "How Sure Are You That You Will Graduate From High School?" (continued)

		Very sure I'll graduate	I'll probably graduate	I probably won't graduate	Very sure I graduate
SOCIOECONOMIC STATUS					
Lowest Quartile	s.e.	1.17	1.10	0.26	0.37
	unwt n	3603	3603	3603	3603
25-49%	s.e.	0.86	0.83	0.16	0.20
	unwt n	4066	4066	4066	4066
50-74%	s.e.	0.67	0.64	0.12	0.22
	unwt n	4168	4168	4168	4168
Highest Quartile	s.e.	0.67	0.66	0.05	0.13
	unwt n	5154	5154	5154	5154
SIBLINGS DROPPED OUT					
Have no Siblings	s.e.	1.72	1.68	0.23	0.43
	unwt n	1043	1043	1043	1043
None in HS Yet	s.e.	0.78	0.73	0.20	0.18
	unwt n	4186	4186	4186	4186
None Left School	s.e.	0.60	0.59	0.07	0.08
	unwt n	8484	8484	8484	8484
One Left School	s.e.	1.47	1.40	0.37	0.42
	unwt n	1433	1433	1433	1433
Two left School	s.e.	2.34	2.23	0.36	0.68
	unwt n	690	690	690	690
FRIENDS DROPPED OUT					
None of them	s.e.	0.46	0.44	0.04	0.13
	unwt n	12744	12744	12744	12744
Some of them	s.e.	1.10	1.05	0.29	0.16
	unwt n	3545	3545	3545	3545
Most of them	s.e.	3.80	3.50	1.23	1.88
	unwt n	270	270	270	270
All of them	s.e.	7.05	6.26	1.32	4.05
	unwt n	38	38	38	38

TABLE A4.1. Responses to the question "How Sure Are You That You Will Graduate From High School?" (continued)

		Very sure I'll graduate	I'll probably graduate	I probably won't graduate	Very sure I graduate
TEST QUARTILE					
Lowest Quartile	s.e.	1.15	1.09	0.29	0.32
	unwt n	3470	3470	3470	3470
25-49 %	s.e.	0.81	0.79	0.14	0.14
	unwt n	4063	4063	4063	4063
50-74 %	s.e.	0.57	0.56	0.07	0.10
	unwt n	4225	4225	4225	4225
Highest Quartile	s.e.	0.46	0.46	0.03	0.02
	unwt n	4877	4877	4877	4877
HIGH SCHOOL PROGRAM					
General	s.e.	0.68	0.65	0.12	0.19
	unwt n	7040	7040	7040	7040
Academic	s.e.	0.50	0.48	0.06	0.12
	unwt n	6291	6291	6291	6291
Vocational/Tech	s.e.	1.60	1.49	0.46	0.63
	unwt n	1559	1559	1559	1559
Other	s.e.	1.76	1.71	0.37	0.20
	unwt n	994	994	994	994
Don't know	s.e.	2.04	1.99	0.35	0.43
	unwt n	1270	1270	1270	1270
SCHOOL CONTROL					
Public	s.e.	0.48	0.46	0.09	0.13
	unwt n	15040	15040	15040	15040
Catholic	s.e.	0.95	0.89	0.07	0.28
	unwt n	981	981	981	981
NAIS	s.e.	0.69	0.65	0.00	0.17
	unwt n	1073	1073	1073	1073
Other Private	s.e.	4.56	4.56	0.00	0.16
	unwt n	384	384	384	384

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A4.2.
10th grade students giving various responses to the question "How far in school do you think you will get?"

		Less than high school graduation	High School graduation	Vocational Trade, or business school	Some college (less than 4 yr. degree)	College Graduation	Graduate Degree
TOTAL	s.e.	0.08	0.41	0.44	0.50	0.59	0.63
	unwt n	17336	17336	17336	17336	17336	17336
SEX							
Male	s.e.	0.12	0.50	0.67	0.71	0.83	0.86
	unwt n	8618	8618	8618	8618	8618	8618
Female	s.e.	0.10	0.60	0.50	0.68	0.80	0.83
	unwt n	8718	8718	8718	8718	8718	8718
RACE							
Asian	s.e.	0.64	1.79	2.00	1.50	1.97	2.81
	unwt n	1148	1148	1148	1148	1148	1148
Hispanic	s.e.	0.28	1.11	1.30	1.78	1.38	1.48
	unwt n	2099	2099	2099	2099	2099	2099
Black	s.e.	0.31	1.08	1.69	1.31	1.87	2.04
	unwt n	1680	1680	1680	1680	1680	1680
White	s.e.	0.07	0.47	0.48	0.56	0.66	0.72
	unwt n	12133	12133	12133	12133	12133	12133
American Indian	s.e.	0.63	6.31	3.41	3.49	3.96	3.28
	unwt n	192	192	192	192	192	192

Table A4.2.
10th grade students giving various responses to the question "How far in school do you think you will get?" (continued)

		Less than high school graduation	High School graduation	Vocational Trade, or business school	Some college (less than 4 yr. degree)	College Graduation	Graduate Degree
PARENTS EDUCATION							
Less than H.S.	s.e.	0.51	2.41	1.28	1.73	1.46	1.41
	unwt n	1471	1471	1471	1471	1471	1471
H.S. Graduate	s.e.	0.17	1.03	0.98	1.27	1.14	1.12
	unwt n	3245	3245	3245	3245	3245	3245
Some College	s.e.	0.09	0.45	0.76	0.68	0.87	0.88
	unwt n	6522	6522	6522	6522	6522	6522
College Graduate	s.e.	0.02	0.48	0.52	1.09	1.32	1.35
	unwt n	2677	2677	2677	2677	2677	2677
Advanced Degree	s.e.	0.28	0.31	0.53	0.99	1.77	1.80
	unwt n	2755	2755	2755	2755	2755	2755
SOCIOECONOMIC STATUS							
Lowest Quartile	s.e.	0.24	1.31	0.96	1.03	1.01	1.08
	unwt n	3557	3557	3557	3557	3557	3557
25-49 %	s.e.	0.14	0.75	1.10	1.09	1.11	1.02
	unwt n	4018	4018	4018	4018	4018	4018
50-74 %	s.e.	0.09	0.54	0.67	0.99	1.12	1.05
	unwt n	4119	4119	4119	4119	4119	4119
Highest Quartile	s.e.	0.15	0.20	0.34	0.69	1.12	1.19
	unwt n	5124	5124	5124	5124	5124	5124

Table A4.2.
10th grade students giving various responses to the question "How far in school do you think you will get?" (continued)

		Less than high school graduation	High School graduation	Vocational Trade, or business school	Some college (less than 4 yr. degree)	College Graduation	Graduate Degree
EXPECT JOB AT 30							
Prof/Teach/Tech	s.e.	0.04	0.27	0.36	0.66	0.81	0.90
	unwt n	9483	9483	9483	9483	9483	9483
Sell/Serv/Clerical	s.e.	0.28	0.92	1.28	1.16	1.11	1.13
	unwt n	2494	2494	2494	2494	2494	2494
Military/Protect	s.e.	0.60	1.46	2.23	1.86	2.16	1.64
	unwt n	855	855	855	855	855	855
Labor/Operative	s.e.	1.85	3.87	7.79	3.13	3.13	2.88
	unwt n	235	235	235	235	235	235
Homemaker	s.e.	0.83	3.98	3.92	2.92	2.65	1.37
	unwt n	321	321	321	321	321	321
Other	s.e.	0.17	1.15	0.93	1.90	1.86	1.98
	unwt n	1291	1291	1291	1291	1291	1291
Don't Know	s.e.	0.29	1.37	1.15	1.71	1.85	1.55
	unwt n	1594	1594	1594	1594	1594	1594

Table A4.2.
10th grade students giving various responses to the question "How far in school do you think you will get?" (continued)

		Less than high school graduation	High School graduation	Vocational Trade, or business school	Some college (less than 4 yr. degree)	College Graduation	Graduate Degree
TEST QUARTILE							
Lowest Quartile	s.e.	0.24	0.97	1.02	1.16	1.21	1.28
	unwt n	3399	3399	3399	3399	3399	3399
25-49 %	s.e.	0.17	0.68	1.05	1.09	1.00	0.89
	unwt n	4025	4025	4025	4025	4025	4025
50-74 %	s.e.	0.06	0.50	0.74	0.82	1.11	1.03
	unwt n	4188	4188	4188	4188	4188	4188
Highest Quartile	s.e.	0.10	0.24	0.31	0.63	1.15	1.22
	unwt n	4854	4854	4854	4854	4854	4854
H.S. PROGRAM							
General	s.e.	0.14	0.71	0.65	0.73	0.80	0.82
	unwt n	6975	6975	6975	6975	6975	6975
Academic	s.e.	0.06	0.28	0.36	0.78	1.04	1.15
	unwt n	6246	6246	6246	6246	6246	6246
Vocational/Tech	s.e.	0.30	1.41	1.62	1.63	1.40	1.33
	unwt n	1546	1546	1546	1546	546	1546
Other	s.e.	0.39	1.35	1.80	1.89	2.49	2.13
	unwt n	974	974	974	974	974	974
Don't know	s.e.	0.40	1.92	1.42	1.93	2.15	1.31
	unwt n	1248	1248	1248	1248	1248	1248

Table A4.2.
10th grade students giving various responses to the question "How far in school do you think you will get?" (continued)

		Less than high school graduation	High School graduation	Vocational Trade, or business school	Some college (less than 4 yr. degree)	College Graduation	Graduate Degree
SCHOOL CONTROL							
Public	s.e.	0.08	0.45	0.48	0.53	0.62	0.62
	unwt n	14880	14880	14880	14880	14880	14880
Catholic	s.e.	0.40	0.81	0.69	1.56	2.24	2.74
	unwt n	967	967	967	967	967	967
NAIS	s.e.	0.04	0.08	0.08	3.90	4.71	5.89
	unwt n	1063	1063	1063	1063	1063	1063
Other Private	s.e.	0.04	2.12	1.05	2.57	4.50	5.37
	unwt n	381	381	381	381	381	381

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A4.3 Percentage of 1990 Sophomores who Report They Have Taken or Plan to Take the PSAT, SAT or ACT

	PSAT			SAT			ACT		
	Haven't thought about it	No, don't plan to take it	Yes, this year, next or 12th grade	Haven't thought about it	No, don't plan to take it	Yes, this year, next on 12 grade	Haven't thought about it	No, don't plan to take it	Yes, this year, next or 12th grade
TOTAL									
s.e.	0.74	0.38	0.82	0.66	0.36	0.745	0.72	0.43	0.74
unwt n	16474	16474	16474	16497	16497	16497	16309	16309	16309
RESPONDENTS' CERTAINTY TO GRADUATE FROM HS									
R Sure to Grad HS									
s.e.	0.77	0.41	0.88	0.68	0.38	0.77	0.77	0.46	0.81
unwt n	14386	14386	14386	14418	14418	14418	14258	14258	14258
Probably Grad HS									
s.e.	1.87	0.91	1.84	1.80	0.96	1.81	1.63	1.15	1.42
unwt n	1839	1839	1839	1836	1836	1836	1808	1808	1808
Probably Not									
s.e.	5.74	3.64	5.48	5.90	5.04	6.13	6.00	4.20	6.57
unwt n	118	118	118	115	115	115	116	116	116
Definitely Not									
s.e.	6.01	3.39	6.33	5.64	3.76	6.52	6.27	4.25	5.88
unwt n	119	119	119	118	118	118	117	117	117
HOW FAR RESPONDENT WILL GET IN SCHOOL									
LT H.S Graduate									
s.e.	6.89	6.20	5.18	6.97	6.88	3.32	7.01	6.543	5.098
unwt n	91	91	91	90	90	90	90	90	90

Table A4.3 Percentage of 1990 Sophomores who Report They Have Taken or Plan to Take the PSAT, SAT or ACT--(continued)

	PSAT			SAT			ACT		
	Haven't thought about it	No, don't plan to take it	Yes, this year, next or 12th grade	Haven't thought about it	No, don't plan to take it	Yes, this year, next on 12 grade	Haven't thought about it	No, don't plan to take it	Yes, this year, next or 12th grade
H.S. Graduation									
s.e.	1.82	1.57	1.56	1.82	1.68	1.37	1.88	1.80	1.02
unwt n	1403	1403	1403	1395	1395	1395	1388	1388	1388
Vocational,trade									
s.e.	1.59	0.97	1.39	1.59	1.06	1.40	1.78	1.71	1.21
unwt n	1849	1849	1849	1842	1842	1842	1824	1824	1824
Some College									
s.e.	1.60	1.15	1.66	1.56	0.93	1.58	1.54	0.78	1.53
unwt n	2658	2658	2658	2649	2649	2649	2628	2628	2628
College Graduate									
s.e.	0.92	0.47	1.03	0.78	0.32	0.83	1.08	0.60	1.23
unwt n	5385	5385	5385	5405	5405	5405	5321	5321	5321
Graduate Degree									
s.e.	1.04	0.69	1.20	0.92	0.63	1.06	1.35	0.55	1.37
unwt n	4946	4946	4946	4975	4975	4975	4917	4917	4917
ADVANCED PLACEMENT									
Yes									
s.e.	0.95	0.44	1.05	0.84	0.28	0.88	1.28	0.76	1.43
unwt n	4659	4659	4659	4683	4683	4683	4631	4631	4631

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A4.3 Percentage of 1990 Sophomores who Report They Have Taken or Plan to Take the PSAT, SAT or ACT--continued

		PSAT			SAT			ACT		
		Haven't thought about it	No, don't plan to take it	Yes, this year, next or 12th grade	Haven't thought about it	No, don't plan to take it	Yes, this year, next on 12 grade	Haven't thought about it	No, don't plan to take it	Yes, this year, next or 12th grade
No										
	s.e.	0.83	0.49	0.89	0.77	0.48	0.85	0.81	0.52	0.81
	unwt n	11465	11465	11465	11462	11462	11462	11335	11335	11335
MATH COURSETAKING										
Low										
	s.e.	1.39	1.14	1.32	1.38	1.17	1.38	1.41	1.14	1.38
	unwt n	3603	3603	3603	3587	3587	3587	3550	3550	3550
Middle										
	s.e.	0.90	0.44	1.00	0.82	0.33	0.88	0.90	0.50	0.97
	unwt n	8448	8448	8448	8475	8475	8475	8372	8372	8372
Advanced										
	s.e.	1.14	0.48	1.26	0.99	0.30	1.07	1.55	0.62	1.53
	unwt n	4373	4373	4373	4388	4388	4388	4344	4344	4344
SCIENCE COURSETAKING										
Low										
	s.e.	2.70	2.74	2.74	2.83	2.72	2.56	2.66	1.51	2.75
	unwt n	954	954	954	947	947	947	931	931	931
Middle										
	s.e.	0.81	0.42	0.88	0.70	0.39	0.79	0.82	0.48	0.84
	unwt n	12462	12462	12462	12496	12496	12496	12371	12371	12371

Table A4.3 Percentage of 1990 Sophomores who Report They Have Taken or Plan to Take the PSAT, SAT or ACT–continued

	PSAT			SAT			ACT		
	Haven't thought about it	No, don't plan to take it	Yes, this year, next or 12th grade	Haven't thought about it	No, don't plan to take it	Yes, this year, next on 12 grade	Haven't thought about it	No, don't plan to take it	Yes, this year, next or 12th grade
Advanced									
s.e.	1.32	0.54	1.47	1.15	0.42	1.26	1.67	1.13	1.88
unwt n	2982	2982	2982	2984	2984	2984	2941	2941	2941
COMPOSITE TEST QUARTILE									
Lowest Quartile									
s.e.	1.50	1.11	1.46	1.51	1.16	1.52	1.49	0.97	1.57
unwt n	3214	3214	3214	3176	3176	3176	3141	3141	3141
25-49 %									
s.e.	1.32	0.78	1.34	1.25	0.80	1.27	1.26	1.00	1.16
unwt n	3879	3879	3879	3898	3898	3898	3857	3857	3857
50-74 %									
s.e.	1.22	0.65	1.31	1.08	0.32	1.11	1.27	0.74	1.24
unwt n	4116	4116	4116	4134	4134	4134	4076	4076	4076
Highest Quartile									
s.e.	0.96	0.40	1.07	0.79	0.23	0.82	1.34	0.58	1.36
unwt n	4784	4784	4784	4816	4816	4816	4774	4774	4774
H.S. PROGRAM									
General									
s.e.	1.04	0.63	1.08	0.97	0.62	1.04	0.96	0.52	0.99
unwt n	6625	6625	6625	6620	6620	6620	6535	6535	6535

Table A4.3 Percentage of 1990 Sophomores who Report They Have Taken or Plan to Take the PSAT, SAT or ACT--continued

		PSAT			SAT			ACT		
		Haven't thought about it	No, don't plan to take it	Yes, this year, next or 12th grade	Haven't thought about it	No, don't plan to take it	Yes, this year, next on 12 grade	Haven't thought about it	No, don't plan to take it	Yes, this year, next or 12th grade
Academic										
	s.e.	0.89	0.50	1.07	0.76	0.25	0.79	1.39	0.70	1.41
	unwt n	5985	5985	5985	6014	6014	6014	5954	5954	5954
Vocational/Tech										
	s.e.	1.91	1.04	1.93	1.94	1.30	1.92	1.88	1.20	1.77
	unwt n	1441	1441	1441	1437	1437	1437	1422	1422	1422
Other										
	s.e.	2.56	1.40	2.66	2.48	1.19	2.66	2.54	1.15	2.34
	unwt n	913	913	913	911	911	911	904	904	904
Don't know										
	s.e.	2.38	2.05	2.38	2.36	1.97	2.36	2.36	2.00	2.15
	unwt n	1183	1183	1183	1182	1182	1182	1170	1170	1170
SCHOOL CONTROL										
Public										
	s.e.	0.76	0.41	0.84	0.68	0.39	0.77	0.74	0.45	0.77
	unwt n	14119	14119	14119	14125	14125	14125	13989	13989	13989
Catholic										
	s.e.	2.42	0.89	2.64	2.04	0.80	2.09	3.16	1.33	3.39
	unwt n	931	931	931	945	945	945	928	928	928

Table A4.3 Percentage of 1990 Sophomores who Report They Have Taken or Plan to Take the PSAT, SAT or ACT–continued

	PSAT			SAT			ACT		
	Haven't thought about it	No, don't plan to take it	Yes, this year, next or 12th grade	Haven't thought about it	No, don't plan to take it	Yes, this year, next on 12 grade	Haven't thought about it	No, don't plan to take it	Yes, this year, next or 12th grade
NAIS									
s.e.	4.28	0.80	4.40	4.15	0.41	4.15	8.33	5.42	5.84
unwt n	1026	1026	1026	1026	1026	1026	999	999	999
Other Private									
s.e.	4.30	1.75	4.86	3.60	1.38	4.16	4.80	2.49	4.91
unwt n	367	367	367	370	370	370	363	363	363

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

TABLE A4.4
Responses to the Question "What Does Your School Counselor Think Is the Most Important Thing for You to Do Right After High School?"

		Go to College	Get a full-time Job	Enter a trade School or apprenticeship program	Enter Military Service	They think I should do what I want	They don't care	I don't know
TOTAL								
	s.e.	0.72	0.16	0.15	0.10	0.34	0.28	0.61
	unwt n	15571	15571	15571	15571	15571	15571	15571
SEX								
Male								
	s.e.	0.98	0.15	0.26	0.19	0.49	0.26	0.82
	unwt n	7625	7625	7625	7625	7625	7625	7625
Female								
	s.e.	0.93	0.28	0.17	0.08	0.45	0.48	0.75
	unwt n	7946	7946	7946	7946	7946	7946	7946
RACE								
Asian								
	s.e.	2.40	0.29	0.45	0.28	1.39	0.78	2.25
	unwt n	1043	1043	1043	1043	1043	1043	1043
Hispanic								
	s.e.	2.04	0.16	0.48	0.13	1.27	0.68	1.45
	unwt n	1813	1813	1813	1813	1813	1813	1813
Black								
	s.e.	2.39	0.35	0.54	0.48	0.73	0.53	2.25
	unwt n	1462	1462	1462	1462	1462	1462	1462
White								
	s.e.	0.80	0.11	0.18	0.11	0.41	0.36	0.69
	unwt n	11027	11027	11027	11027	11027	11027	11027

TABLE A4.4
Responses to the Question "What Does Your School Counselor Think Is the Most Important Thing for You to Do Right After High School?" –(continued)

	Go to College	Get a full-time Job	Enter a trade School or apprenticeship program	Enter Military Service	They think I should do what I want	They don't care	I don't know
American Indian							
s.e.	7.86	9.15	2.11	0.64	2.47	0.90	4.74
unwt n	163	163	163	163	163	163	163
SOCIOECONOMIC STATUS							
Lowest Quartile							
s.e.	1.52	0.62	0.43	0.25	0.73	1.15	1.26
unwt n	3053	3053	3053	3053	3053	3053	3053
25-49 %							
s.e.	1.37	0.26	0.36	0.33	0.73	0.36	1.24
unwt n	3611	3611	3611	3611	3611	3611	3611
50-74 %							
s.e.	1.24	0.12	0.26	0.08	0.56	0.34	1.12
unwt n	3753	3753	3753	3753	3753	3753	3753
Highest Quartile							
s.e.	1.07	0.06	0.18	0.08	0.49	0.27	0.90
unwt n	4727	4727	4727	4727	4727	4727	4727

TABLE A4.4

Responses to the Question "What Does Your School Counselor Think Is the Most Important Thing for You to Do Right After High School?" –(continued)

	Go to College	Get a full-time Job	Enter a trade School or apprenticeship program	Enter Military Service	They think I should do what I want	They don't care	I don't know
TEST QUARTILE							
Lowest Quartile							
	1.52	0.62	0.43	0.25	0.73	1.15	1.26
unwt n	2933	2933	2933	2933	2933	2933	2933
25-49 %							
s.e.	1.33	0.29	0.35	0.21	0.71	0.33	1.30
unwt n	3653	3653	3653	3653	3653	3653	3653
50-74 %							
s.e.	1.21	0.08	0.26	0.24	0.66	0.32	1.04
unwt n	3916	3916	3916	3916	3916	3916	3916
Highest Quartile							
s.e.	1.15	0.02	0.07	0.05	0.48	0.29	0.99
unwt n	4615	4615	4615	4615	4615	4615	4615
H.S. PROGRAM							
General							
s.e.	1.02	0.16	0.28	0.15	0.53	0.58	0.92
unwt n	6197	6197	6197	6197	6197	6197	6197
Academic							
s.e.	0.91	0.11	0.12	0.05	0.50	0.24	0.70
unwt n	5800	5800	5800	5800	5800	5800	5800

TABLE A4.4.
Responses to the Question "What Does Your School Counselor Think Is the Most Important Thing for You to Do Right After High School?" –(continued)

	Go to College	Get a full-time Job	Enter a trade School or apprenticeship program	Enter Military Service	They think I should do what I want	They don't care	I don't know
Vocational/Tech							
s.e.	2.06	0.46	0.70	0.70	1.28	0.61	1.98
unwt n	1334	1334	1334	1334	1334	1334	1334
Other							
s.e.	2.97	0.33	0.80	0.40	1.10	0.95	2.38
unwt n	833	833	833	833	833	833	833
Don't know							
s.e.	2.35	1.52	0.58	0.45	1.59	0.87	2.15
unwt n	1095	1095	1095	1095	1095	1095	1095
SCHOOL CONTROL							
Public							
s.e.	0.74	0.17	0.17	0.11	0.35	0.30	0.64
unwt n	13391	13391	13391	13391	13391	13391	13391
Catholic							
s.e.	2.38	0.27	0.26	0.00	1.26	0.71	1.98
unwt n	913	913	913	913	913	913	913
NAIS							
s.e.	4.45	0.00	0.06	0.00	3.57	0.38	2.27
unwt n	951	951	951	951	951	951	951
Other Private							
s.e.	3.97	0.18	1.02	0.37	1.15	1.74	3.31
unwt n	291	291	291	291	291	291	291

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table AF4.5.

Percentage of 10th grade students giving various response to the question "How far in school does your mother want you to go?"

		Less than high school graduation	High school graduation	Vocational, Trade or business school	Some college (less than 4 yr degree)	College graduation	Graduate school	Don't know	Parent doesn't care
TOTAL		0.54	5.00	7.06	14.84	45.21	19.78	6.30	1.26
	s.e.	0.08	0.42	0.34	0.42	0.66	0.56	0.28	0.14
	unwt n	16719	16719	16719	16719	16719	16719	16719	16719
SEX									
Male		0.48	5.61	8.04	15.94	43.97	18.16	6.50	1.29
	s.e.	0.07	0.598	0.56	0.60	0.89	0.80	0.40	0.23
	unwt n	8236	8236	8236	8236	8236	8236	8236	8236
Female		0.60	4.40	6.10	13.77	46.41	21.36	6.11	1.24
	s.e.	0.14	0.59	0.36	0.58	0.91	0.70	0.35	0.15
	unwt n	8483	8483	8483	8483	8483	8483	8483	8483
RACE									
Asian		0.33	6.58	3.30	9.90	40.50	32.73	5.32	1.35
	s.e.	0.15	2.00	0.62	1.22	2.69	2.49	0.84	0.45
	unwt n	1092	1092	1092	1092	1092	1092	1092	1092
Hispanic		2.32	4.39	6.54	17.92	38.44	21.97	6.88	1.54
	s.e.	0.58	0.73	0.79	1.63	1.70	1.45	0.88	0.36
	unwt n	1971	1971	1971	1971	1971	1971	1971	1971
Black		0.63	4.76	5.85	15.78	38.15	26.73	6.94	1.16
	s.e.	0.17	1.44	1.67	1.35	1.99	2.17	1.04	0.35
	unwt n	1569	1569	1569	1569	1569	1569	1569	1569
White		0.29	4.90	7.47	14.48	47.82	17.66	6.15	1.23
	s.e.	0.05	0.48	0.36	0.50	0.74	0.63	0.30	0.18
	unwt n	11830	11830	11830	11830	11830	11830	11830	11830
American Indian		0.78	14.59	9.59	15.58	32.88	18.09	6.38	2.11
	s.e.	0.57	6.82	2.01	3.47	5.90	3.08	1.78	1.11
	unwt n	178	178	178	178	178	178	178	178

Table AF4.5.
Percentage of 10th grade students giving various response to the question "How far in school does your mother want you to go?" (continued)

	Less than high school graduation	High school graduation	Vocational, Trade or business school	Some college (less than 4 yr degree)	College graduation	Graduate school	Don't know	Parent doesn't care
PARENT EDUCATION								
Less than H.S.	2.55	12.17	12.03	14.89	33.21	13.59	10.18	1.37
s.e.	0.47	2.52	1.21	1.35	1.98	1.56	1.12	0.33
unwt n	1373	1373	1373	1373	1373	1373	1373	1373
H.S. Graduate	0.50	10.29	10.14	15.71	40.05	11.86	8.94	2.51
s.e.	0.11	1.19	0.64	0.94	1.34	0.75	0.68	0.56
unwt n	3090	3090	3090	3090	3090	3090	3090	3090
Some College	0.30	3.54	7.86	16.68	46.73	17.22	6.62	1.05
s.e.	0.09	0.35	0.66	0.65	1.01	0.79	0.45	0.14
unwt n	6337	6337	6337	6337	6337	6337	6337	6337
College Graduate	0.06	0.98	2.24	13.62	55.86	23.82	3.03	0.39
s.e.	0.05	0.20	0.29	1.21	1.54	1.29	0.41	0.13
unwt n	2609	2609	2609	2609	2609	2609	2609	2609
Advanced Degree	0.09	1.70	1.32	7.31	47.47	38.88	2.48	0.75
s.e.	0.05	1.49	0.30	0.68	1.80	1.85	0.47	0.25
unwt n	2706	2706	2706	2706	2706	2706	2706	2706
FAMILY COMPOSITION								
Mother & Father	0.40	4.34	6.39	14.39	47.68	20.63	5.28	0.88
s.e.	0.09	0.46	0.31	0.51	0.78	0.6	0.28	0.12
unwt n	11132	11132	11132	11132	11132	11132	11132	11132
Father & Other Fem	0.14	10.37	7.69	19.37	39.71	9.87	9.30	3.54
s.e.	0.14	2.99	2.40	2.99	3.47	1.66	1.96	0.98
unwt n	447	447	447	447	447	447	447	447
Father only	1.29	18.45	6.29	13.75	31.86	13.94	10.74	3.66
s.e.	0.66	8.28	1.32	2.57	4.26	4.06	2.65	0.97
unwt n	394	394	394	394	394	394	394	394

Table AF4.5.
Percentage of 10th grade students giving various response to the question "How far in school does your mother want you to go?" (continued)

	Less than high school graduation	High school graduation	Vocational, Trade or business school	Some college (less than 4 yr degree)	College graduation	Graduate school	Don't know	Parent doesn't care
Mother & Other Male	0.69	3.97	9.37	15.19	43.28	18.89	7.59	1.02
s.e.	0.26	0.53	1.59	1.40	1.85	1.47	0.96	0.26
unwt n	1857	1857	1857	1857	1857	1857	1857	1857
Mother only	0.67	4.65	7.86	15.82	42.46	19.51	6.97	2.06
s.e.	0.16	0.65	0.82	1.11	1.47	1.41	0.70	0.70
unwt n	2348	2348	2348	2348	2348	2348	2348	2348
Other Adult	1.25	6.21	5.56	12.66	38.43	21.07	12.30	2.52
s.e.	0.45	2.07	1.12	2.03	3.59	3.98	2.52	0.75
unwt n	413	413	413	413	413	413	413	413
SOCIOECONOMIC QUARTILES								
Lowest Quartile	1.69	11.80	12.21	15.61	32.84	13.57	10.28	2.00
s.e.	0.30	1.48	0.76	0.87	1.19	0.86	0.69	0.44
unwt n	3325	3325	3325	3325	3325	3325	3325	3325
25-49 %	0.36	5.81	10.32	16.57	43.40	14.12	7.57	1.85
s.e.	0.09	0.59	0.99	0.77	1.29	0.93	0.62	0.36
unwt n	3869	3869	3869	3869	3869	3869	3869	3869
50-74 %	0.21	2.76	5.24	16.86	49.85	18.13	6.22	0.72
s.e.	0.13	0.40	0.44	0.96	1.23	1.01	0.60	0.13
unwt n	4018	4018	4018	4018	4018	4018	4018	4018
Highest Quartile	0.06	1.31	1.45	9.76	53.33	31.38	2.09	0.61
s.e.	0.03	0.76	0.25	0.59	1.21	1.22	0.26	0.15
unwt n	5034	5034	5034	5034	5034	5034	5034	5034
TEST QUARTILES								
Lowest Quartile	1.53	10.84	11.96	17.95	28.72	15.08	11.83	2.10
s.e.	0.22	1.42	0.73	0.96	1.22	1.35	0.79	0.29
unwt n	3149	3149	3149	3149	3149	3149	3149	3149

Table AF4.5.
Percentage of 10th grade students giving various response to the question "How far in school does your mother want you to go?" (continued)

		Less than high school graduation	High school graduation	Vocational, Trade or business school	Some college (less than 4 yr degree)	College graduation	Graduate school	Don't know	Parent doesn't care
25-49 %		0.50	4.81	10.07	18.52	43.30	13.04	8.27	1.50
	s.e.	0.16	0.44	0.91	0.88	1.19	0.81	0.63	0.44
	unwt n	3879	3879	3879	3879	3879	3879	3879	3879
50-74 %		0.14	3.01	5.73	14.60	52.82	18.23	4.52	0.94
	s.e.	0.06	0.52	0.55	0.73	1.17	0.94	0.40	0.19
	unwt n	4110	4110	4110	4110	4110	4110	4110	4110
Highest Quartile		0.08	0.70	1.99	8.46	54.19	31.68	2.37	0.53
	s.e.	0.04	0.18	0.24	0.75	1.18	1.12	0.28	0.11
	unwt n	4797	4797	4797	4797	4797	4797	4797	4797
SCHOOL CONTROL									
Public		0.59	5.51	7.46	15.66	44.58	18.18	6.65	1.36
	s.e.	0.08	0.47	0.37	0.45	0.68	0.52	0.29	0.16
	unwt n	14306	14306	14306	14306	14306	14306	14306	14306
Catholic		0.04	0.23	1.85	7.50	53.40	33.75	2.79	0.43
	s.e.	0.04	0.12	0.57	1.10	2.42	2.56	0.77	0.18
	unwt n	959	959	959	959	959	959	959	959
NAIS		0.06	0.02	0.04	3.14	38.72	56.31	1.44	0.26
	s.e.	0.06	0.02	0.04	0.90	6.62	7.14	0.49	0.16
	unwt n	1045	1045	1045	1045	1045	1045	1045	1045
Other Private		0.49	1.23	6.76	11.96	52.59	23.30	2.98	0.68
	s.e.	0.46	0.79	0.91	2.44	4.06	4.70	0.86	0.67
	unwt n	375	375	375	375	375	375	375	375

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

APPENDIX B: Methodological and Technical Notes

APPENDIX B: METHODOLOGICAL AND TECHNICAL NOTES

B.1 ACCURACY OF ESTIMATES

The accuracy of reported statistics is determined by the joint effects of sampling and nonsampling errors. Sample surveys such as NELS:88, and universe surveys as well, are subject to nonsampling errors. Nonsampling error may arise from a number of sources, such as the inability to obtain cooperation from a sample member, or the unwillingness or inability of a respondent to answer a given item asked in a survey. In addition, the exclusion of persons who should be included in the universe, variability in providing estimates, differences in interpreting the meaning or intent of questions, and errors in data capture, editing, or coding may also result in nonsampling error. Nonsampling errors in NELS:88 are discussed in the base year and first follow-up user's manuals and technical reports. The overall quality of the base year student questionnaire data is assessed in Kaufman and Rasinski (1991)[1]. Assessments of first follow-up data quality issues appear in the user's manuals and the first follow-up final technical report.

Estimates of sampling variability--expressed as the standard error of measurement--appear in Appendix A, along with sample sizes (unweighted *N*s) for weighted estimates presented in this report.[2] (Although statistics reported in the tables of this report are weighted--that is, are population estimates--sample sizes are critical to determining statistical significance and are therefore reported with the standard errors). Sampling errors occur because the data are collected from a sample of the population rather than the entire population. The standard error is a measure of the variability due to sampling when measuring a parameter. It indicates how much variance there is in the population of possible estimates of a parameter for a given sample size. Standard errors can be used as a measure of the precision expected from a particular sample.

The sample estimate and an estimate of its standard error permit us to construct interval estimates with prescribed confidence that the interval includes the average result of all possible samples. An interval from two standard deviations below an estimate to two standard deviations above an estimate constitutes a 95 percent confidence interval.

NELS:88 estimates the tenth-grade public school population at a total that falls somewhat below the number recorded by the NCES Common Core of Data. Among other reasons, this discrepancy is partly a function of the exclusion of certain schools from the NELS:88 base year sampling frame, the exclusion of 5.34 percent of the students in the schools that were included in the sampling frame, and the difference between autumn and spring enrollment figures (fall enrollments tend to be higher--spring enrollment figures reflect attrition within the grade, particularly the impact on enrollment of dropping out). Many of the excluded students--specifically, those whose eligibility status has changed or who were

[1] Quality of the Responses of Eighth-Grade Students in NELS:88, 1991. Washington, D.C.: National Center for Education Statistics (NCES 91-487). On issues of the general quality of data supplied by high school students, see the analysis of HS&B conducted by Fetters, Stowe and Owings (1984).

[2] Two variance estimation packages were used to calculate Taylor Series approximations of standard errors, C-Tab and SUDAAN. However, standard errors reported for the math and reading proficiency tables are Design Effect-corrected standard errors. With C-Tab estimation package, sample sizes reported, for example in Appendix A, are the size of the entire row, not the individual cell sizes for a row.

deemed to have been misclassified--will be added in to the NELS:88 longitudinal sample, to reflect the results of the Base Year Ineligibles study of the first follow-up, and the Followback Study of Excluded Students of the second follow-up.[3]

B.2 STATISTICAL PROCEDURES

Comparisons that have been drawn in the text of this report have been tested for statistical significance to ensure that the differences are larger than those that might be expected due to sampling variation. The statistical comparisons in this report were based on the *t* statistic. Generally, whether the statistical test is considered significant or not is determined by calculating a *t* value for the difference between a pair of means or proportions and comparing this value to published tables of values at certain critical levels, called "alpha levels." The alpha level is an *a priori* statement of the probability that a difference exists in fact rather than by chance.

To guard against errors of inference based upon multiple comparisons, the Bonferroni procedure[4] to adjust significance tests for multiple contrasts was used. This method corrects the significance (or alpha) level for the total number of contrasts made with a particular classification variable. For each classification variable, there are (K*[K-1])/2 possible contrasts (or nonredundant pairwise comparisons), where K is the number of categories. For example, if a classification variable has four categories, K=4 and there are (4*3)/2=6 possible comparisons between the categories, the Bonferroni procedure divides the alpha-level for a single *t*-test (for example, 0.05) by the number of possible pairwise comparisons to derive a new alpha corrected for the fact that multiple contrasts are being made.

Interested readers can compute the *t* statistic between estimates from various subgroups presented in the tables using the following formula:

$$t = \frac{X_1 - X_2}{\sqrt{SE_1^2 + SE_2^2}}$$

where X_1 and X_2 are the estimates to be compared and SE_1 and SE_2 are their corresponding standard errors.

For example, to test for significant differences in the proportion of whites, blacks, and Asians who had completed a year of geometry by the spring of sophomore year, the following procedures would be implemented:

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[3]Some 314 base year ineligibles were classified as eligible for the first follow-up and completed a first follow-up questionnaire. These cases will be integrated into the first follow-up sample at the time of the second follow-up data release. Individuals from this group who were 1990 sophomores should in principle have been included in the analyses in this report, as well as in the trend comparison to HS&B (Rasinski, Ingels, Rock and Pollack, 1993). They were not included because weights had not yet been generated for them at the time of the first follow-up data release; their omission should have but a modest impact on the estimates reported here and in other first follow-up reports.

[4]For detailed discussion, see, for example, Hays, W.L. (1988). Statistics. (4th ed.) New York: Holt, Rinehart, Winston.

1. Establish the number of comparisons -- in this case three (whites and blacks; whites and Asians; and blacks and Asians). The number of possible two-way comparisons equals **(K*[K-1])/2** where K is the number of variable categories. Thus, with three categories the number of possible comparisons is ([3][2])/2 = 3.

2. Divide the desired alpha level, 0.05, by the number of comparisons (for example, three) to derive the new alpha (0.05/3 = 0.0166).

3. Consult a table of *t* statistics (or the standard normal table for z values if the N is large) to find the t value that corresponds to that alpha (*t* = 2.39 for alpha = 0.0166).

B.3 ANALYSIS PROCEDURES

The combined base year-first follow-up student data files contain several distinct analysis populations. These include:

- Population 1 -- the eighth-grade cohort in 1988;
- Population 2 -- a subsample of the 1988 eighth-grade cohort in 1990; and
- Population 3 -- the sophomore cohort in 1990, comprising all members of population 2 who were enrolled in tenth grade and a sample of freshened 1990 tenth graders who were not in eighth grade in the spring term of 1988.

The basic first follow-up nonresponse-adjusted weight--F1QWT--sums to all sophomores (including students added in sample freshening), and all retained members of the eighth-grade cohort regardless of grade or enrollment status. In other words, the data file population is the sum of groups 2 and 3 above, minus the overlap between these populations. While these populations overlap to a high degree, they are also distinct. Cross-sectional analyses reported in ***A Profile of the American High School Sophomore in 1990*** therefore were restricted to students[5] (sample *N* = 17,544) enrolled in tenth grade in the spring term of the 1990 school year; students out of grade sequence and dropouts (including dropouts from the freshening sample) were excluded. Longitudinal analyses, on the other hand, employed the special panel flag and panel weight, for the 17,424 members of the eighth-grade cohort who completed a questionnaire both in 1988 and 1990. For details on proper use of weights and flags to define analysis populations in NELS:88, see the NELS:88 ***First Follow-up Student Component Data File User's Manual*** (Ingels et al., 1992).

This document reports univariate distributions and crosstabular analyses. Nevertheless, many of the background variables commonly employed in educational research (race, socioeconomic status, school control type, and so on) are highly related to each other. Readers are cautioned that multivariate analysis, which was not utilized in this report, generally allows for a more appropriate description of interrelationships.

[5]The term "student" was defined broadly in the NELS:88 first follow-up as any individual who was receiving academic or vocational instruction, whether in school, at home, in an institution, or through an alternative program. However, alternative students were not necessarily in graded programs with a sophomore status; nonsophomores were excluded from the analyses in this report.

B.4 VARIABLES USED

The estimates presented in this report are based on the privileged-use data files; these differ slightly from the public use file. To ensure full confidentiality protection for all survey respondents, procedures commonly applied to protect individual respondent identities from disclosure--including suppressing, abridging, and recoding information that might pose a disclosure risk--were used in preparing the public use data file.[6]

Some variables employed in this report were taken directly from the student questionnaire. In addition, a number of classification variables have been constructed for analytic purposes. Some of these constructed variables appear on the student data files for the convenience of data users; others were specially constructed for this report. Below, we discuss first the constructed variables, then variables that were utilized in unaltered form. Labels for base year variables begin with BY; for first follow-up with F1, except for a few composite variables that are prefaced with "G10" and reference tenth grade. (Further information on these variables, including precise item wording, response categories, frequencies, and weighted and unweighted response percents, can be found in the student component user's manual.)

Constructed Variables. An example of a variable specially created for this paper is the mathematics "opportunity to learn" (advanced math course taking) variable. This variable was derived in the following way.

Math Coursework Level. Using question F1S22 from the student questionnaire, all individuals were selected who reported having taken at least one year of coursework from the following categories (the year could be a cumulative total across the listed courses):

algebra II, trigonometry, precalculus, calculus

This was defined as the advanced math group. The middle-level group comprised those individuals who did not qualify for the advanced group but report taking one year or more of algebra I or geometry. Finally, the low-level math group consisted of all remaining students. (These students had taken no math, or math courses such as general math, business math, and prealgebra, or less than a year of algebra or geometry). This scheme fits well--but nevertheless imperfectly--with the most common ways of sequencing courses in the mathematics curriculum, since in some schools sophomores may take algebra II before geometry. A science coursework variable was also created.

Science Coursework Level. Using **F1S23** from the student questionnaire, sophomores with one year or more in chemistry or physics were classified as being in the advanced science group. The middle group comprised individuals who did not qualify for the high group but reported taking one year or more of the following classes: biology, general science, physical science, earth science, or other science. Finally, the low coursework group consisted of all remaining sophomores (including those enrolled in principles of technology).

Another variable created for analysis purposes was **1990 Family Composition.** This variable represents a collapsed presentation of student questionnaire item 92 (**F1S92**).

[6]For details on deleted, abridged or recoded variables in the public release files see the first follow-up student component data user's manual (Ingels, Scott, Lindmark, Frankel & Myers, 1992).

For Chapter 3, a sophomore **Time Budget** composite was created to describe time spent in five out-of-school activities: television viewing, employment, outside reading, homework completed outside school, and extracurricular activities. "Hours per week in television-viewing" was constructed from **F1S45A** and **B**. "Don't watch TV" was given a value of 0; "LT 1 hour/day" a value of .5 hours; "1 -2 hours" a value of 1.5 hours; 2 - 3 hours a value of 2.5; 3 - 4 hours a value of 3.5; 4 - 5 hours a value of 4.5; over 5 hours was given a value of 5.5. Weekday values were multiplied by 5 and weekend values were multiplied by 2 and weekend and weekday then summed for a weekly estimate. To compute time spent working on an outside job, item **F1S85** was utilized. Arraying the five possible response values of this variable from lowest to highest, values were assigned as 5, 15.5, 25.5, 35.5, and 40 hours respectively. Nonresponse was treated as 0. Outside reading was derived from **F1S43**. The eight possible response values for this variable were arrayed from lowest to highest and assigned 0, 1, 2, 3, 4.5, 6.5, 8.5, and 10 hours respectively. Homework was computed on the basis of **F1S36B** only, that is, time spent on homework outside of school. There were eight response categories; arrayed from lowest to highest, they were assigned values of 0, 1, 2.5, 5, 8, 11, 14, and 15 hours respectively. Finally, "weekly hours spent in extracurricular activities" was computed from **F1S42**. The six response categories were assigned, from lowest to highest, the following hour values: 0, .5, 2.5, 7, 14.5, and 20.

Classification variables taken directly from the student data files include enrollment status, socioeconomic (SES) status quartile, race/ethnicity, school control, urbanicity (metropolitan status), parent education, test quartile, and test proficiency or mastery level. Further detail about the derivation of these variables is presented in the ***First Follow-Up Student Component Data File User's Manual*** (Ingels et al., 1992).

Socioeconomic Status. **F1SES** was constructed using base year parent questionnaire data, when available. The following parent data were used: father's education level, mother's education level, father's occupation, mother's occupation, and family income (data coming from BYP30, BYP31, FYP34B, BYP37B and BYP80). Education-level data were recoded according to the definition of BYPARED described below. Occupation data were recoded using the Duncan SEI scale as used in HS&B and NLS-72. Parent data were used to construct F1SES if at least one component was not missing.

If all parent data components were missing, the following base year student questionnaire items were used to calculate F1SES for base year respondents: father's education level (BYS34A), mother's educational level (BYS34B), father's occupation (BYS7B), mother's occupation (BYS4B), and presence of household items (BYS35A-P). For base year nonrespondents and first follow-up freshened students, the equivalent New Student Supplement items were used (F1N20A, F1N20B, F1N7B, F1N5B, and F1N21A-P, respectively). The first four components from the base year student/NSS data are the same as the components from the base year parent data (i.e., education-level data, BYS34A/F1N20A and BYS34B/F1N20B, similarly recoded; occupation data, BYS4B/F1N7B and BYS7B/F1N5B of student data, also recoded). The fifth component of F1SES from the student data was derived by summing the non-missing household items listed in BYS35A-P or in F1N21A-P (after recoding "Not Have Item" from "2" to "0"), calculating a simple mean of these items, and then standardizing this mean. If eight or more items in BYS35A-P or F1N21A-P were nonmissing, this component was computed; otherwise it was set to missing.

Each nonmissing component (after any necessary recoding) was standardized to a mean of 0 and a standard deviation of 1. Nonmissing standardized components were averaged yielding the F1SES composite.

F1SESQ is the quartile into which F1SES falls. It was constructed by recoding F1SES into quartiles based on the weighted, F1QWT, marginal distribution, for all 1990 completed cases: sophomores, dropouts, and students who were not in modal sequence, that is, 1988 eighth graders who were in grades other than grade 10 in spring 1990.[7] The values for F1SESQ are:

1 = Quartile 1 Low
2 = Quartile 2
3 = Quartile 3
4 = Quartile 4 High
8 = Missing

Race/Ethnicity. Race is a composite variable; that is, it was constructed from multiple sources of information. The preferred source was the student self-report (from the base year questionnaire or first follow-up new student supplement). If the student information was missing, data from the parent questionnaire were used, or from sampling rosters if parent data were unavailable as well. The race categories are Asian (including Pacific Islanders); Hispanic, regardless of race; Black, not of Hispanic origin; White, not of Hispanic origin; and American Indian or Alaskan Native.

School Control. Two different school classification schemes are used in the NELS:88 data. The scheme used in this paper classified schools by their control into public, Catholic, independent (defined as members of the National Association of Independent Schools), and all other private schools.

F1PARED characterizes the highest level of education attained by either of the parents of the student. It was constructed using the parent questionnaire data (BYP30 and BYP31). Base year student data (BYS34A & BYS34B) were used for base year respondents whenever parent data were either missing or not available. For base year nonrespondents with missing or unavailable parent data and first follow-up freshened students, the New Student Supplement questions F1N20A and F1N20B were used. That is, the first follow-up composite starts with the BYPARED variable. If BYPARED is missing or the case is a freshened student, first follow-up New Student Supplement data were used.

General Description of the NELS:88 Cognitive Test Scores. There are two broad types of scores available on the NELS:88 data files. One type is a **normative** score and the second type is a **criterion-referenced proficiency** (or "mastery") score. The **normative** scores can be divided into two subclasses, longitudinal, and cross-sectional. There are also two types of **criterion-referenced** scores--dichotomous proficiency scores, and probability of proficiency scores.

Normative Scores. There are two types of normative scores on the NELS:88 data set. One type is longitudinally-equated--the IRT-estimated number right score. The second type of score--the achievement quartile--is standardized within a survey wave, that is, cross-sectionally.

The longitudinally-equated score that is available for both time points and all four achievement areas is the IRT-estimated number right score. The IRT-estimated number right for any individual at either of the two time periods reflects an estimate of the number of items that a person would have answered correctly if he or she had taken all of the items that appeared in any form of the test. The IRT model allows one to put all the scores in, say mathematics, on the same vertical scale so that the scores,

[7]To obtain more precision for certain cross-sectional analyses of sophomores that employ SES quartiles, the quartiles may be redrawn, based on the sophomore cohort sample, which F1SESQ, used in this report, only approximates.

regardless of grade, can be interpreted in the same way. All the normal statistical operations that apply to any cognitive test score can be legitimately applied to the IRT-estimated number right.

Quartile scores are cross-sectional in that they are standardized within each of the weighted NELS:88 sample waves. Since the achievement quartiles are standardized within each wave, they are not vertically equated as are the IRT-estimated number right scores. These cross-sectional scores are primarily used in descriptive tables that compare data within a particular grade.

Criterion-Referenced Proficiency Scores. The two kinds of criterion-referenced mastery scores are based on clusters of items having similar content and difficulty. The first kind is a dichotomous score of "0" or "1" where a "1" indicates mastery of the material at this objective level and a "0" implies non-mastery. The second kind is a continuous score indicating the probability that a student has mastered the type of items that describe a particular criterion-referenced level.

The 0-1 dichotomous proficiency scores were available only in mathematics and reading at the time that this report was prepared, although proficiency scores are being generated for science as well and will be included in the second follow-up release. The proficiency levels are hierarchically ordered in the sense that mastery of the highest level among three levels implies that one would have also mastered the lower two levels.

The second kind of proficiency score is the probability of being proficient at each of the levels. This is a continuous analogue to the dichotomous proficiency scores. The advantage of the probability score over the dichotomous proficiency score is that the probability score is continuous and thus statistically more powerful, and poses less of a missing data problem in that probabilities of being proficient at each level are available for any individual who had a test score in grade ten. The proficiency probabilities are particularly appropriate for relating specific processes to changes that occur at different points along the score scale.

Of course, NELS:88 data may support other approaches (than those embodied in the proficiency level scheme) to identifying the different components of achievement and providing multidimensional scores that can be related to various student, teacher and school variables. (See, for example, Kupermintz et al. on NELS:88 mathematics data, and Hamilton et al. on NELS:88 science data.)

Standardized Test Scores, Quartile Test Scores, and Proficiency Scores

The NELS:88 first follow-up cognitive test battery consisted of multiple choice tests in four subject areas:

- Reading Comprehension (21 questions, 21 minutes)--This subtest contained five short reading passages, with three to six questions about the content of each. Questions encompassed understanding the meaning of words in context, identifying figures of speech, interpreting the author's perspective, and evaluating the passage as a whole.

- Mathematics (40 questions, 30 minutes)--Test items included word problems, graphs, equations, quantitative comparisons, and geometric figures. Some questions could be answered by simple application of skills or knowledge; others required the student to demonstrate a more advanced level of comprehension or problem solving.

- Science (25 questions, 20 minutes)--The science test contained questions drawn from the fields of life science, earth science, and physical science/chemistry. Emphasis was placed on understanding of underlying concepts rather than retention of isolated facts.

- History/Citizenship/Geography (30 questions, 14 minutes)--American history questions addressed important issues and events in political and economic history from colonial times through the recent past. Citizenship items included questions on the workings of the federal government and the rights and obligations of citizens. The geography questions touched on patterns of settlement and food production shared by other societies as well as our own.

Score means and standard deviations, reliabilities (coefficient alpha), and standard errors of measurement for each NELS:88 first follow-up subtest are shown in Table B.1. The standardized cognitive test scores reported in the NELS:88 database are transformations of the IRT-Estimated Number Right scores, rescaled to a mean of 50 and standard deviation of 10 (using the first follow-up questionnaire weight).

Table B.1: Test Means, Standard Deviations, Reliabilities, and SEs

	MEAN	S.D.	ALPHA	S.E.
Reading--Low Form . . .	11.6	4.4	.80	2.0
Reading--High Form . . .	14.1	4.1	.78	1.9
Mathematics--Low Form	17.4	6.1	.79	2.8
Mathematics--Mid Form	23.3	7.5	.86	2.8
Mathematics--High Form	32.3	5.0	.81	2.2
Science	13.7	5.2	.83	2.2
Social Studies	18.9	6.0	.85	2.3

The four NELS:88 achievement tests were designed to reflect the high school curriculum. Central emphasis was placed on general concepts and the development of problem-solving abilities, rather than on highly specific curriculum content--given the heterogeneity of the high school curriculum, the two year interval between testing, and the problem, for gain measurement, of "forgetting" if tests emphasize curriculum-related knowledge that is highly specific. To make them more adaptive and increase the precision of measurement, two of the tests--reading and mathematics--had multiple forms or levels; assignment to a high or low form of the 1990 test was based on performance on the 1988 test. Table B.2 gives curriculum content and mastery or process specifications for the cognitive test battery across all three waves. Further information about test construction, and the psychometric properties of the tests, can be found in the *NELS:88 Base Year Psychometric Report* (Rock and Pollack, NCES 1991); in chapter 6 of the *NELS:88 First Follow-Up Final Technical Report* (Ingels, Scott, Rock, Pollack, and Rasinski; NCES, 1994); and in the (forthcoming, NCES) *NELS:88 Base Year Through Second Follow-Up Psychometric Report* (Rock and Pollack, 1994).

Table B.2

NELS:88 Reading Specifications
Content by Process by Test Forms

Process	Literary	Science	Social Studies/Other
Reproduction of Detail			
8th Grade	3	1	-
10th Grade Low	3	1	-
10th Grade High	2	1	1
12th Grade Low	3	1	1
12th Grade High	-	-	1
Comprehension of Thought			
8th Grade	1	1	1
10th Grade Low	1	1	1
10th Grade High	3	1	2
12th Grade Low	-	2	4
12th Grade High	-	1	8
Inferences and/or Evaluative Judgements			
8th Grade	10	1	3
10th Grade Low	10	1	3
10th Grade High	9	1	1
12th Grade Low	6	1	3
12th Grade High	4	3	3

Table B.2, continued

NELS:88 Math Specifications
Content by Process by Test Forms

Process	Arithmetic	Algebra	Geometry	Data/Prob	Adv Topic
Skill/Knowledge					
8th Grade	10	5	1	1	-
10th Grade Low	12	4	2	-	-
10th Grade Med	9	3	-	1	1
10th Grade High	6	3	-	2	2
12th Grade Low	10	4	2	-	-
12th Grade Med	7	2	-	1	1
12th Grade High	1	2	-	1	2
Under/Comprehen					
8th Grade	6	7	3	3	-
10th Grade Low	7	6	3	2	-
10th Grade Med	6	6	3	2	-
10th Grade High	3	7	2	3	2
12th Grade Low	6	5	3	3	-
12th Grade Med	4	6	4	2	-
12th Grade High	1	5	7	1	3
Problem Solving					
8th Grade	3	-	-	-	1
10th Grade Low	3	-	-	-	1
10th Grade Med	3	2	2	-	2
10th Grade High	2	2	3	-	2
12th Grade Low	4	-	2	-	1
12th Grade Med	4	3	5	-	1
12th Grade High	2	4	9	1	1

Table B.2, continued

NELS:88 Science Specifications
Content by Process by Test Forms

Process	Earth Sci	Chem	Sci Meth	Life Sci	Phy Sci
Skill/Knowledge					
8th Grade	5	2	-	3	-
10th Grade	3	2	-	2	1
12th Grade	3	3	-	3	1
Under/Comprehen					
8th Grade	2	2	1	2	-
10th Grade	2	1	1	2	1
12th Grade	1	-	3	1	-
Problem Solving					
8th Grade	1	3	2	2	-
10th Grade	-	3	1	3	2
12th Grade	-	3	1	2	4

NELS:88 Social Studies Specifications
Content by Test Forms

	Cit/Govt	Am Hist	Geog
8th Grade	13	14	3
10th Grade	8	19	3
12th Grade	12	15	3

Achievement Quartile Scores. Quartile scores are based on the weighted frequency distribution of scores, with 1 being the lowest quartile and 4 the highest. The Standardized Test Composite is the equally weighted mean of the standardized reading and mathematics scores, restandardized to mean 50, standard deviation 10. Note that the quartile scores that appear on the data files and that were used in this analysis are based on the entire NELS:88 first follow-up population, and not on a population solely of spring 1990 sophomores. Although this was not done in this report, some further increase in the precision of sophomore estimates could be obtained by redrawing the test quartiles to reflect tenth graders only. Differences between groups obtained from comparison of quartiles cannot automatically be assumed to form significant contrasts within different test result reporting formats, such as comparisons of overall mean scores or proficiency scores. (Nor are all differences that are statistically significant necessarily practically significant; consequently, effect sizes may also need to be taken into account.)

Specific quartile scores employed in this report were as follows:

- Math test quartile--**F1TXMQ**
- Science test quartile--**F1TXSQ**
- Reading test quartile--**F1TXRQ**
- Social studies test quartile--**F1TXHQ**
- Composite (reading-math) test quartile--**F1TXCOMP**

Proficiency Scores. The NELS:88 combined base year-first follow-up data release provided proficiency scores in two areas, mathematics and reading. Subsequently, proficiency scores at eighth and tenth grade levels have been produced for science, and will be included in the NELS:88 second follow-up release; science proficiency scores were not available in time for use in the analyses in this report. The proficiency scores provide a means of distinguishing total score gain, as measured by overall IRT-Estimated Number Right scores and Standardized scores, from gain in specific skills. At several points along the score scale of the reading and mathematics tests, four-item clusters of test questions having similar content and difficulty were identified. A student was assumed to have mastered a particular level of proficiency if at least three of the four items in the cluster were answered correctly and to have failed at this level if two or more items were wrong. Clusters of items provide a more reliable test of proficiency than do single items because of the possibility of guessing in a multiple choice test: it is very unlikely that a student who has not mastered a particular skill would be able to guess enough answers correctly in a four-item cluster. (For some of the students who had omitted critical items, a complex IRT-based procedure, which is described elsewhere, was undertaken to resolve proficiency score assignments.) The proficiency levels were assumed to follow a Guttman model; that is, a student passing a particular skill level was expected to have mastered all lower levels; a failure should have indicated nonmastery at higher levels. A small percentage of students had response patterns that did not follow the Guttman model, with a failing score at a lower level followed by a pass on a more difficult item cluster. Students with these "reversal" patterns were not assigned proficiency scores.

Two levels of proficiency were marked in the reading test, and four in the mathematics test, defined as follows.

- Reading Level 1 - simple reading comprehension including reproduction of detail or the author's main thought

- Reading Level 2 - ability to make inferences beyond the author's main thought or understand and evaluate relatively abstract concepts

- Math Level 1 - simple arithmetical operations on whole numbers
- Math Level 2 - simple operations with decimals, fractions, and roots
- Math Level 3 - simple problem solving, requiring conceptual understanding or the development of a solution strategy
- Math Level 4 - conceptual understanding and complex problem solving

IRT Re-Scaling of NELS:88 Base Year and First Follow-Up Test Scores in the Second Follow-Up. IRT models the probability of answering an item correctly as a mathematical function of proficiency or skill, thus permitting use of a common scale on which performance can be compared across groups (including those who took easier or harder versions of the NELS:88 tests) and time (NELS:88 results must be put on the same vertical [that is, eighth to tenth to twelfth grade] scale). A third data point (1992) for the NELS:88 test battery permits refinement of the IRT-derived item parameters and ability estimates of first follow-up (and base year) test results. That is to say, because NELS:88 is a longitudinal study in which many items are common across all three administrations, additional vertical scaling data become available with each successive round, permitting pooled re-estimation of item parameters and ability distributions, with the result that earlier parameter estimates can be improved. The use of all data points over time is the method best suited to providing stable estimates of both the item traces and latent trait scores throughout the entire ability distribution. Second follow-up IRT scores were computed using a Bayesian scaling program (PARSCALE) that took prior-round ability estimates into account.[8] First follow-up test results were rescaled and will be re-released in the second follow-up.

Although rescored first follow-up test data to be released later in 1994 differ little from data used in this report, such rescaling helps to "shrink" any ceiling (or floor) effects so that cognitive growth in the four tested subjects can more accurately be measured for the highest-performing (or lowest-performing) students. The resulting changes in test scores, however, are quite small. The following Pearson correlation coefficients for originally released and second follow-up rescaled 1990 test results for IRT-estimated number right scores are as follows: mathematics, .992; science, .997; reading, .992; and social studies, .991.

Of the two kinds of cross-sectional achievement scores employed in this report, one--the dichotomous proficiency scores--will not change, while the others--achievement quartiles, probability proficiencies--will be subject to some extremely small change. While differences in the rescaled scores should not affect the conclusions of analyses reported here, it should be noted that to *exactly* replicate the 1990 quartile score results presented in this report, one must use the test scores from the initial (1992) release rather than the second follow-up re-release (1994).

[8]Pooling all three time points, which amounts to pooling all items as well as people and recomputing all the item parameters using Bayesian priors reflecting the ability distributions associated with each particular test form, provides for an empirically based shrinkage to more reasonable item parameters and ability scores. The fact that the total item pool is used in conjunction with Bayesian priors leads to a shrinking back of the extreme item parameters as well as the perfect scores to a more reasonable quantity, which in turn allows for the potential of some gains even in the uppermost tail of the distribution. This approach--using adaptive testing procedures combined with Bayesian procedures that allow for priors on both ability distributions and on the item parameters--is an effective means for minimizing ceiling and floor effects in longitudinal assessments.

Gains in Math Proficiency. Analyses in this report are cross-sectional in nature, and the various measures of changes in achievement developed for the NELS:88 first follow-up were not employed in this report. However, in setting a wider context for these cross-sectional findings, we have reported key results from other NELS:88 (and NAEP) reports. It is perhaps worth noting that on one point two of these cited analyses differ somewhat in their conclusions regarding gender differences in 1988-1990 gains in math proficiency. Rock, Owings and Lee (1994) report a small practical but statistically significant male advantage in growth of mathematics mastery (in general, Rock, Owings and Lee report, males made more gains than did females, though for students in the normal mathematics progression, greater male gains can be found only for those individuals who were classified as being proficient at simple problem-solving in eighth grade.) The somewhat different findings reported in Scott, Rock, Pollack and Ingels (1994)--namely, that there were no differences between the two gender groups in terms of either raw gain (measured in mean scores) or patterns of gain across the proficiency levels--is best explained by the fact of differences in the proficiency variables and corresponding cases employed.

Achievement gains can be examined using either dichotomous proficiency scores (as in Rock, Owings, and Lee), or the continuous change in probability of proficiency scores (as in Scott, Rock, Pollack, and Ingels). Rock, Owings and Lee examine percentage changes in the proportion of students classified as being at a given mathematics proficiency level between 1988 and 1990; the sample N for whom the relevant variables (BYTXMPRO and F1TXMPRO) were available was 12,532. The analysis in Scott, Rock, Pollack and Ingels employed a different proficiency gain variable--change in proficiency probability, a non-linear function of the total scale score--as well as IRT number right scores. The sample N available for these measures was 15,315. (For further information on the various NELS:88 cognitive test variables that can be employed in measuring cognitive gains, see Ingels, Scott, Lindmark, Frankel and Myers, 1992, Appendix I pp. 17-23.)

Other Variables. In addition to the constructed variables enumerated above, some row and column variables that appear in the tables in this report were taken directly, without alteration, from the student data file. These variables are presented below as a content stem accompanied by their variable label from the first follow-up data files. For example, the first follow-up question on the teacher's emphasis on learning and memorizing mathematics facts, rules, and steps, is subpart B of question 31. It bears the variable name "F1S31B"--F1 standing for the first follow-up, S for the student questionnaire, and 31B for the specific data element--part B of question 31 on the student questionnaire. Variables are listed below, sequenced according to the order of their appearance on the data files, which reflects their sequence in the student questionnaire as well.

- How Sure of Graduating from HS--**F1S18A**

- High School Program--**F1S20**. High school program is based on student self-report of placement in general, vocational, or academic track. Transcripts (NELS:88 transcript data were not yet available when analyses were conducted for this report) offer a more objective and reliable indicator of program placement than do self-report data. (However, analysis of course-taking does not readily explicate program categories such as "general", but rather, supports a scheme of more and less rigorous academic track, vocational, and combinations of academic and vocational.) Sophomores are fairly early in their secondary school careers so that their program status may still be ambiguous; over 7 percent of sophomores reported that they did not know their program type. Nevertheless, for those who can identify their program, self-reports of program placement have been found to correspond reasonably well to courses taken (see Gamoran 1987; Vanfossen, Jones and Spade 1987; Fennessey, Alexander, Riordan and Salganik 1981). Moreover, self-reports, even when not wholly objectively accurate, are important,

insofar as they convey students' perceptions of the programs they are enrolled in. Thus Gamoran, while noting that transcript data provide a more instructionally-sensitive basis for categorizing students' program placement, observes that self-reports are nonetheless especially relevant for the study of track effects on achievement. Self-reports are likely to "capture the social-psychological aspects of tracking because track perceptions are linked to expectations and peer associations" (Gamoran 1992; cf. Gamoran and Berends 1987; Hallinan and Williams 1989).

- Academic coursework--**F1S22-24**. Academic coursework is based on student reports. Comparison of student self-report data and high school transcripts data suggest that student reports somewhat inflate the number of courses completed as well as grades received (Fetters, Stowe & Owings, 1984).[9] Evidence from the NELS:88 base year also points in this direction: rather implausibly, 2 percent of 1988 eighth graders reported taking both advanced math/algebra and remedial math; student reports put 32 percent of the sample in the algebra/advanced math track, though teacher reports indicated that 24 percent of the sample was so placed (Hafner, Ingels, Schneider & Stevenson, 1990, p.78, endnotes 8 and 9). If student course-taking as reported in F1S22-24 somewhat overstates the curriculum exposure of 1990 sophomores, corrected estimates can be obtained from the NELS:88 academic transcripts study when results are released in the spring of 1995.

- Instructional demand to show understanding--**F1S26**

- Instructional practices--**F1S29** (science), **F1S32** (math)

- Classroom emphasis on objectives--**F1S30** (science), **F1S31** (math)

- Ever in advanced placement program--**F1S34E**

- Ninth-tenth grade math grades, science grades--**F1S39**. Again, self-reported grades are not as accurate as transcripts-recorded grades. Tenth grade transcripts for this cohort will not be available until completion of the NELS:88 academic transcripts study in the second follow-up.

- Television watching--**F1S45**

- What people think student should do after HS--**F1S47**

- Educational expectations (how far in school expect to get)--**F1S49**[10]

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[9]In their comparison of HS&B sophomore cohort transcript and 1982 self-report data, Fetters, Stowe and Owings found correlation coefficients in the .80's for amount of coursework in specific foreign languages and for whether geometry, physics, or chemistry ever was taken. However, "the coefficients are somewhat lower, ranging from .63 to .70, for amounts of coursework in mathematics and science and for whether 2nd-year algebra, trigonometry, and calculus ever were taken....Seniors tended to report they had taken more coursework in most areas than reflected by their transcripts. The amount of over-reporting was greatest for mathematics (about 1 semester) and science (about 1/2 semester)." (p.vii).

[10]This variable proved a powerful predictor in HS&B. Pelavin and Kane (1990, p. 33) indicate that "Sophomores' intentions with regard to postsecondary education are strongly associated with their college attendance... More than 85 percent of the students who indicated that they expected to continue their education at least through a bachelor's degree attended college within four years of high school graduation. Sophomores who intended to finish college were five times as likely to proceed directly from high school to a four-year college or university as those who did not think they would obtain

- Test-taking plans--**F1S50**
- Type of job respondent expects to have at age 30--**F1S53**
- Close friends who have dropped out before graduation--**F1S69**
- Hours worked per week--**F1S85**
- Job: Type of Student Employment--**F1S87**
- Wages--**F1S88**
- Older siblings who have dropped out before graduation--**F1S94**
- Parent checking homework, frequency--**F1S100A**
- Parent limitation of TV/video games--**F1S100F**
- Parental limitation of time with friends--**F1S100G**
- Who decides school classes--**F1S104C**
- Who decides student employment--**F1S104D**
- Who decides college attendance--**F1S104J**
- Frequency of ACT/SAT discussion with parents--**F1S105F**

a bachelor's degree (55 versus 11 percent)." In their NELS:88 analyses of changes in mathematics proficiency between grades eight and ten, Rock, Owings and Lee (1994) found that even after controlling for eighth grade mathematics proficiency level, students who had reported expectations as eighth graders that they would obtain college degrees (BYS45/BYPSEPLN) were more likely to be classified at higher mathematics proficiency levels as tenth graders than were students with lesser expectations.

B.5 ADDITIONAL INFORMATION

Additional information about the aims and design of the study, data collection results, and documentation of the data files is provided in various NELS:88 documentary reports. Specifically, detailed information on the sample design, universe coverage, sample selection procedures, weighting methodology, selected standard error estimates, estimates of design effects for broad categories of students, and results of nonresponse analyses is reported in the base year sample design report (Spencer, Frankel, Ingels, Rasinski & Tourangeau, 1990), first follow-up student data file user's manual (Ingels, Scott, Lindmark, Frankel, & Myers, 1992), and the base year and first follow-up final technical reports (See the bibliographical section of this report for complete reference citations.)

APPENDIX C: Overview of the NELS Program and the NELS:88 First Follow-Up (1990)

The NCES National Education Longitudinal Studies (NELS) Program

The longitudinal studies program of the U.S. Department of Education's National Center for Education Statistics (NCES) reflects the agency's commitment to collect and analyze data on the factors affecting the transitions of students from elementary school to high school and eventually to productive roles in American society. Consistent with its commitment--and in response to the need for policy-relevant, time-series data on nationally representative samples of elementary and secondary students--NCES instituted the National Education Longitudinal Studies (NELS) program, a continuing long-term project. The general aim of the NELS program is to study the educational, vocational, and personal development of students at various grade levels, and the personal, familial, social, institutional, and cultural factors that may affect that development. The NELS program currently consists of three major studies: the National Longitudinal Study of the High School Class of 1972 (NLS-72); High School and Beyond (HS&B); and the National Education Longitudinal Study of 1988 (NELS:88). Taken together, these studies represent the educational experience of youth from three decades-- the 1970s, 1980s, and 1990s. The research design for these three studies is depicted in Figure C.1, below.

NLS-72. The first of the NELS projects, the National Longitudinal Study of the High School Class of 1972 (NLS-72), began in the spring of 1972 with a survey of a national probability sample of 19,001 seniors from 1,061 public, secular private, and church-affiliated high schools. The sample was designed to be representative of the approximately three million high school seniors enrolled in more than 17,000 schools in the spring of 1972. Each sample member was asked to complete a student questionnaire and a 69-minute test battery. School administrators were also asked to supply survey data on each student, as well as information about the schools' programs, resources, and grading systems.

Five follow-ups, conducted in 1973, 1974, 1976, 1979, and 1986, have been completed. At the time of the first follow-up, an additional 4,450 students from the class of 1972 were added to the sample. Through intensive locating and tracking efforts, 13,912 of the 1972 base-year respondents and 4,016 participants in the expanded first follow-up sample responded to the fourth follow-up in 1979. The fifth follow-up included 12,841 participants from a subsample of 14,489 respondents who participated in the base year or one of the subsequent follow-ups.

In addition to background information, the NLS-72 base year and follow-up surveys collected data on respondents' educational activities, such as schools attended, grades received, and degree of satisfaction with their educational institutions. Participants were also asked about work experiences, periods of unemployment, job satisfaction, military service, marital status, and children. Attitudinal information on self-concept, goals, participation in political activities, and ratings of their high schools are other topics for which respondents have supplied information.

HS&B. High School and Beyond (HS&B) was designed to build on the NLS-72 in three ways. First, the introduction of a sophomore cohort provided data on the many critical educational and vocational choices made between the sophomore and senior years in high school, permitting a fuller understanding of the secondary school experience and its impact on students, as well as providing a basis for comparing dropouts and school persisters. Second, the base year survey of HS&B included a 1980 cohort of high school seniors that was directly comparable with the 1972 cohort. Replication of selected 1972 student questionnaire items and test items made it possible to analyze changes that occurred subsequent to 1972 and their relationship to recent Federal policies and programs in education. Finally, HS&B expanded the NLS-72 focus by collecting data on a range of lifecycle factors, such as family-formation behavior, intellectual development, and social participation.

The HS&B Base Year Survey. The base year survey was conducted in the spring term of 1980. The study design provided for a highly stratified national probability sample of 1,015 secondary schools as the first stage units of selection. In the second stage, 36 seniors and 36 sophomores were selected in each school (in schools with fewer than 36 students in either of these groups, all eligible students were included). Certain types of schools were oversampled to increase the usefulness of HS&B data for policy analysis. These included public schools with high percentages of Hispanic students, Catholic schools with high percentages of minority students, alternative public high schools, and private schools with high-achieving students.

The HS&B base year student questionnaires focused on individual and family background, high school experiences, work experiences, and plans for the future. The cognitive tests measured verbal and quantitative abilities, and included achievement measures in science, writing, and civics. School questionnaires provided information about enrollment, staff, educational programs, facilities and services, and special programs. A teacher comment checklist provided teacher observations on students, while the parent questionnaire (administered to a subsample of parents) elicited information about how family attitudes and financial planning affected postsecondary educational goals.

The HS&B Follow-Ups. A subsample of the 1980 HS&B senior cohort was followed out of school, and resurveyed in 1982, 1984, and 1986. The sophomore cohort was resurveyed in 1982, when most sample members were high school seniors, although a substantial proportion of the cohort was surveyed out of school, either as dropouts (14%)[1] or early graduates (5%). The sophomore cohort was again resurveyed in 1984, 1986, and in 1992. Postsecondary transcripts information was collected for both cohorts, with the most recent update of sophomore cohort postsecondary transcripts data taking place in the fall of 1992. High School transcripts, however, have been collected only for the sophomore cohort.[2]

In addition to the various follow-ups of the HS&B student sample, there have been two follow-ups of the HS&B school sample. **The Administrator and Teacher Survey (ATS)** was conducted in 1984 in a probability subsample of 479 participating HS&B schools. In order to describe the impact of the school environment on the educational process more precisely, ATS gathered information on school climate, process, and functioning from principals; heads of guidance; vocational and community service program coordinators; and up to thirty teachers in each school. **The National Longitudinal Study of Schools (NLSS)** is an OERI-sponsored follow-up of the HS&B school sample, which was designed to gather information that will describe how American high schools have changed since HS&B (1980-82) and since 1984 (ATS). (The sample was freshened to make it representative of American high schools in 1992). In 1992 data were collected from high school principals about the organization of their school;

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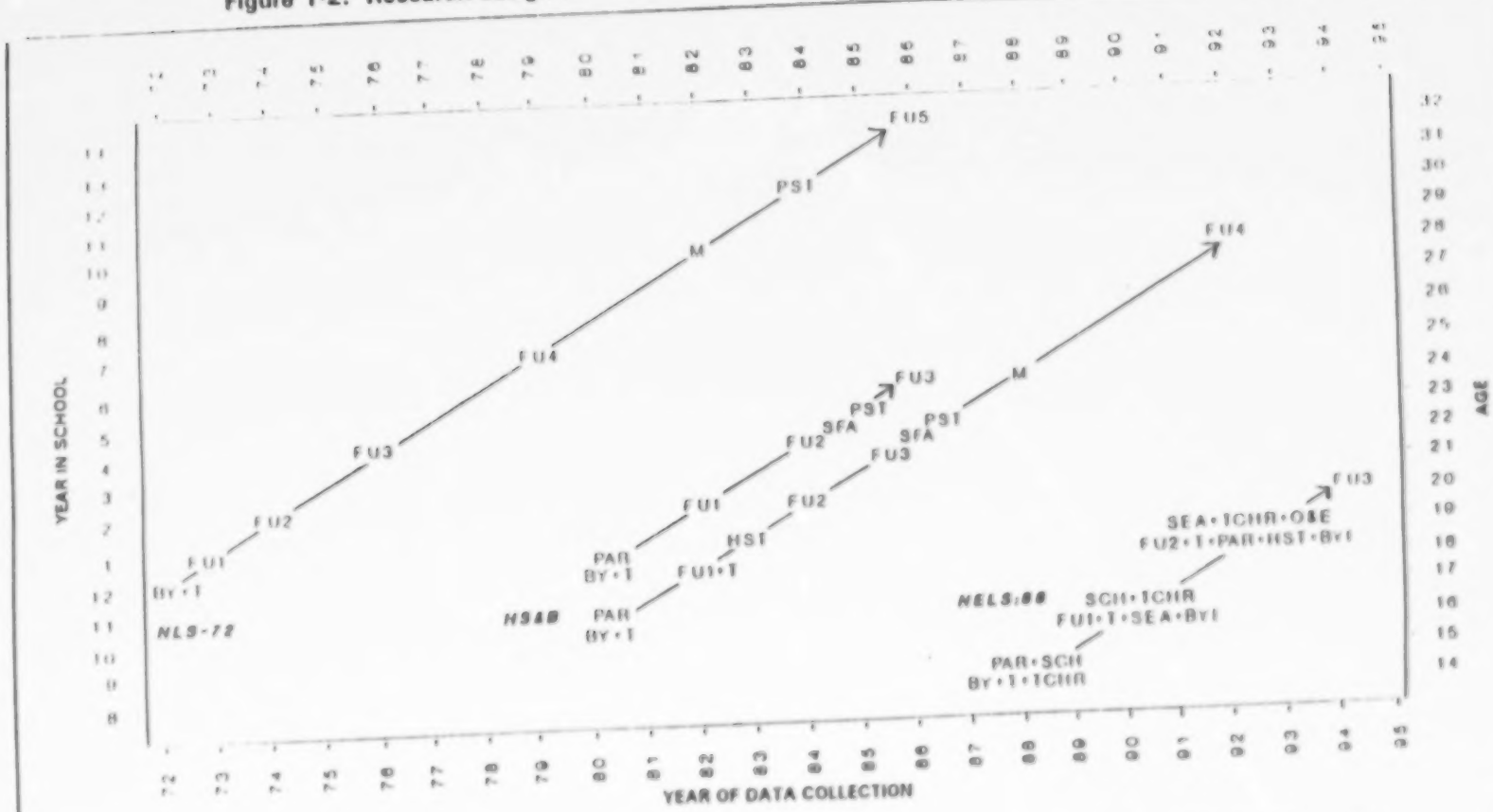
[1]While 13.6 percent of the sophomore cohort was surveyed as dropouts in 1982, some sample members surveyed as students dropped out after survey day or otherwise left school before graduating. Some "missed" dropouts, moreover, were identified through their high school transcripts or in follow-up rounds. An HS&B 1980-82 dropout rate of 17.3 percent can be derived based on third follow-up responses to the question whether the respondent graduated from high school with his or her class or earlier. (By the time of the HS&B third follow-up in 1986, almost half [46.5%] of the HS&B dropouts had completed high school or received a GED. This statistic is slightly misleading however in that GED recipients [and enrollees] were classified as dropouts by HS&B in 1982--if those who had obtained or were preparing for the GED are excluded from the HS&B dropout rate, it falls from 13.6 to 10.9 percent. The HS&B third follow-up revised cohort dropout rate of 17.6 percent may also be somewhat misleading, in that it assimilates late graduation--not graduating with one's class--to dropping out, while the 1982 definition did not.).

[2]Additional high school transcripts data are available through the two high school transcripts studies conducted in NAEP schools of 1987 and 1990 seniors; further high school transcripts data will become available in the course of 1993 with release of the NELS:88 second follow-up academic transcripts data.

Figure 1-2: Research design for the NCES National Education Longitudinal Studies program



NLS 72 = National Longitudinal Study of the High School Class of 1972

BY	= Base year data collection
FU1	= First follow up data collection
FU2	= Second follow up data collection
FU3	= Third follow up data collection
FU4	= Fourth follow up data collection
FU5	= Fifth follow up data collection
M	= Maintenance of address data
PST	= Postsecondary education transcripts
T	= Cognitive test administration

HS&B = High School & Beyond: 1980

BY	= Base year data collection
FU1	= First follow up data collection
FU2	= Second follow up data collection
FU3	= Third follow up data collection
FU4	= Fourth follow up data collection
HST	= High school transcripts
M	= Maintenance of address data
PAR	= Survey of parents
PST	= Postsecondary education transcripts
SFA	= Student financial aid records
T	= Cognitive test administration

NELS:88 = National Education Longitudinal Study of 1988

BY	= Base year data collection
BYI	= Base Year Ineligible Study
FU1	= First follow up data collection
FU2	= Second follow up data collection
FU3	= Third follow up data collection
HST	= High school transcripts
O&E	= Course offerings and enrollment data
PAR	= Survey of parents
SCH	= School administrator survey
SEA	= School Effects Augmentation
T	= Cognitive test administration
TCHR	= Survey of teachers

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key HS&B and ATS items were re-asked. In addition, detailed information about mathematics instruction and assessment was collected from a sample of mathematics teachers. State and local (or diocesan) education agencies were also surveyed, in order to determine the relationship between policy activity and specific changes in the organizational structure of high schools.

Overview of NELS:88

The *1988 base year* of NELS:88 represents the first stage of a major longitudinal effort designed to provide trend data about critical transitions experienced by students as they leave elementary school and progress through high school and into postsecondary institutions or the work force. The 1988 eighth-grade cohort is being followed at 2-year intervals in order to obtain policy-relevant data about educational processes and outcomes--particularly those pertaining to student learning, early and late predictors of dropping out, and school effects on students' access to programs and equal opportunity to learn.

The *first follow-up*, which took place in *1990*, provides the first opportunity for longitudinal measurement of the 1988 baseline sample. It also provides a comparison point to high school sophomores 10 years before, as studied in HS&B. The study captures the population of early dropouts (those who leave school prior to the end of tenth grade), while monitoring the transition of the student population into secondary schooling.

The *second follow-up* took place in *1992*, when most sample members were second-term seniors. The second follow-up provides a culminating measurement of learning in the course of secondary school and collects information that will facilitate investigation of the transition into the labor force and post-secondary education after high school. Because the NELS:88 longitudinal sample was freshened to represent the twelfth-grade class of 1992, trend comparisons can be made to the senior cohorts of 1972 and 1980 that were studied in NLS-72 and HS&B. The NELS:88 second follow-up resurveyed students who were identified as dropouts in 1990 and identified and surveyed those additional students who had left school since the prior wave.

The NELS:88 *third follow-up* will take place in *1994*, when most sample members will have left high school. The primary goals of the 1994 round will be to provide for trend comparisons with NLS-72 and HS&B and to address issues of employment and postsecondary access and choice. Additionally, the third follow-up will provide a basis for assessing how many dropouts have returned to school and by what route and for measuring the access of dropouts to vocational training programs and to other educational opportunities. A *fourth follow-up* is scheduled for *1998*, the year in which most members of the 1988 eighth grade cohort will turn 24.

Study Components. The longitudinal data gathered from students is augmented through parent, teacher, school administrator and archival[3] accounts of students' progression and development. The simultaneous gathering of student and contextual data will lead to a better understanding of various facets of students' lives--their problems and concerns; their relationships with parents, peers, teachers; and the

[3]Academic transcripts are recognized to be an objective and reliable measure of students' educational experience, superior in level of detail, accuracy and completeness to student self-reports of course-taking and grades. As in High School and Beyond (HS&B), transcripts have been collected for students' entire high school careers. In addition to course, credit and grade information, other school records data such as days absent, participation in special programs, class rank, GPA, and test scores (PSAT, SAT, ACT, AP) are included on the transcripts file. NELS:88 transcripts data will be released on a privileged use basis in 1994.

characteristics of their schools--and permit investigation of the effect of these factors on social, behavioral, and educational development. (The basic study components, by round, are sketched in Figure C.2 below.)

Intercohort Comparisons: NELS:88, HS&B, NLS-72. While the primary objective of NELS:88 is to support longitudinal analyses, the study is also designed to support the generation of single estimates in time and time-series (repeated cross-sectional) intercohort comparisons. For purposes of cross-sectional analyses, nationally representative samples of 1990 sophomores and 1992 seniors are made possible by means of a procedure for sample freshening. In both the first and second follow-ups, tenth and twelfth grade students, respectively, who did not have an opportunity for selection into the study in the base year were added to ensure nationally representative cross-sectional cohorts. With the creation of a nationally representative tenth grade cross-sectional cohort, trend comparisons between High School and Beyond (HS&B) 1980 sophomores and 1990 NELS:88 first follow-up sophomores may be drawn. Similarly, cross-cohort comparisons between the NELS:88 senior class of 1992, HS&B seniors of 1980 (and, with some qualification, 1982) and the National Longitudinal Study of the High School Class of 1972 (NLS-72) senior cohort may be conducted after the completion of the second follow-up.

NELS:88 Base Year. The base year survey was conducted in the spring term of the 1987-1988 school year. A clustered, stratified national probability sample of 1,052 public and private eighth grade schools participated. Almost 25,000 students across the United States participated in the base year study. The sample represents the Nation's eighth grade population, totalling over 3 million eighth graders in more than 38,000 schools in spring 1988. Questionnaires and cognitive tests were administered to each student in the NELS:88. The student questionnaire covered school experiences, activities, attitudes, plans, selected background characteristics, and language proficiency. The school principal completed a questionnaire about the school; two teachers of each student were asked to answer questions about the student, about themselves, and about their school; and one parent of each student was surveyed regarding family characteristics and student activities.

Figure C.2: Base Year Through Fourth Follow-Up – NELS:88 Components

BASE YEAR	FIRST FOLLOW-UP	SECOND FOLLOW-UP	THIRD FOLLOW-UP
spring term 1988	spring term 1990	spring term 1992	spring 1994
GRADE 8	MODAL GRADE = SOPHOMORE	MODAL GRADE = SENIOR	H.S. + 2 YEARS
Students: Questionnaire, Tests*	**Dropouts, Students:** Questionnaire, Tests	**Dropouts, Students:** Questionnaire, Tests, H.S. Transcripts	**All Individuals:** Questionnaire
Parents: Questionnaire		**Parents:** Questionnaire	FOURTH FOLLOW-UP
Principals: Questionnaire	**Principals:** Questionnaire	**Principals:** Questionnaire	spring 1998
Two Teachers per student: (taken from English, social studies, mathematics, science)	**Two Teachers per student:** (taken from English, social studies, mathematics, or science)	**One Teacher per student:** (taken from mathematics or science)	HS + 6 YEARS **All Individuals:** Questionnaire

*Reading, social studies, math and science tests are administered in the three in-school rounds.

First Follow-up Design and Data Collection Results

The NELS:88 first follow-up questionnaires and cognitive tests were designed to meet four general requirements for information about American education. These can be characterized as **looking backward** within the cohort to understand the impact of prior experiences, particularly at eighth grade, on current circumstances, **looking ahead** to provide a basis for understanding cohort members' future experiences, **looking within** the cohort at a single point in time to compare the outcomes and experiences of different social groups, and **looking across** cohorts by comparing the experiences of the NELS:88 sophomore cohort to those of sophomores studied in 1980 in HS&B.

Three study components were carried over from the base year of NELS:88, and constitute the main first follow-up design: surveys and tests of students, and surveys of school administrators and teachers. In addition, three new components--the dropout survey, Base Year Ineligible Study, and School Effectiveness Study--where initiated in the first follow-up, and a freshened student sample was added to the student component.

As in the base year, students were asked to complete a questionnaire and cognitive test. The cognitive test was designed to measure tenth grade achievement and cognitive growth between 1988 and 1990 in the subject areas of mathematics, science, social studies (history/citizenship/geography), and reading. The student questionnaire collected basic background information, and asked students about such topics as their school and home environments, participation in classes and extra-curricular activities, current jobs, their goals and aspirations, and opinions about themselves. Also, as in the base year, two teachers of each student were asked to complete a teacher questionnaire. The teacher questionnaire sought evaluations of the sampled student, class-specific information, school level information about institutional climate and policies, and information about the teacher's background and activities. With its ratings of individual students and class-level information about students' exposure to curriculum content and instructional practices, the teacher questionnaire provides a powerful measure of the specific learning environment of each NELS:88 student. In addition, a school administrator questionnaire was completed by principals. If a student was a first-time participant in NELS:88, he or she also completed a new student supplement, containing questions on basic demographic information which were asked in the base year but not repeated in the first follow-up.

In addition to surveying students who were enrolled in school, the first follow-up also surveyed and tested youths who had dropped out of school at some point between the spring term of the 1987-88 school year and that of the 1989-90 school year. The dropout questionnaire collected information on a wide range of subjects, including reasons for leaving school, school experiences, absenteeism, plans for the future, employment, attitudes and self-concept, and home environment.

The selection of students was implemented in two stages. The first stage of sampling involved the selection of 21,474 students who were in the eighth grade NELS:88 sample in 1988. These students were termed "core" students. The core student sample was then augmented through a process called "freshening", the aim of which was to provide a representative sample of students enrolled in the tenth grade in the 1989-90 school year. This "two-stage" sampling design differs substantially from the two-stage design employed in the base year. Unlike the sampling design of the first follow-up, in the base year, eighth grade schools formed the primary sampling units, and a random sample of students within schools formed the second stage units. Consequently the base year provided representative samples of both eighth-grade students and schools, allowing for the use of both data files as stand-alone datasets. In the first follow-up, only the student dataset constitutes a representative probability sample. Freshening

added 1,043 eligible tenth graders who were not contained in the base year sampling frame, either because they were not in the country, or were not in the eighth grade in the spring term of 1988.[4]

The initial data collection period for the first follow-up was from late January to July, 1990. At the end of this period, the pool of nonrespondents (for example, students who had not attended the survey session or had not been located), which was believed to possibly contain "hidden" dropouts, was subsampled and further pursued in a second data collection effort. Figure C-2 outlines the sample and subsamples of the in-school rounds; data collection results are presented in Table 1.

Table 1
Summary of District and School Contacting and Survey Component Completion Rates
NELS:88 FIRST FOLLOW-UP (1990)

	Contacted/Completed	Weighted	Unweighted
Contacting			
District	820	NA	99.2%
Public			
Catholic/			
Other Private	58	NA	100.0%
School			
Public	1,100	NA	99.2%
Catholic/			
Other Private	247	NA	99.2%
Instrument	**Completed**	**Weighted**	**Unweighted**
Student questionnaires	18,221	91.2%	94.2%
Student tests	17,352	94.1%[a]	95.2%[a]
Dropout questionnaires	1,043	91.0%	89.8%
Dropout tests	522	48.6%[a]	50.1%[a]
School admin. questionnaire[b]	17,663	92.0%	96.9%
School admin. questionnaire	1,291	NA	97.1%
Teacher questionnaire[c]	15,908	88.5%	88.7%

[a] Percentages of cases for which a student/dropout questionnaire was obtained for which a cognitive test was also obtained.

[b] Indicates a coverage rate (student participants who have a completed school questionnaire) for the entire student sample, including transfer students who were not eligible for the school administrator component.

[c] Coverage rate for student participants who have one or more completed teacher questionnaire. (Participating teachers = 9,987.)

[4] Additional information about the first follow-up sample design is provided in the *NELS:88 First Follow-Up Student Component Data File User's Manual* and the *NELS:88 First Follow-Up Final Technical Report*.

Design Enhancements. Two supplemental studies were undertaken in the first follow-up essentially to compensate for limitations in the NELS:88 design. At selected schools in the 30 largest MSAs, initial first follow-up student clusters were augmented to obtain a representative in-school sample of sufficient size (approximately 30 students) to sustain analyses of school effects and use of multilevel statistical techniques (for example, hierarchical linear modeling). The data collected for the School Effectiveness Study is not included on the combined base year-first follow-up release but will be made available after the completion of the second follow-up as a 1990-1992 combined data release.

The second supplemental component was the Base Year Ineligible Survey. Owing to a physical or mental disability or insufficient knowledge of the English language such that completion of a self-administered survey form would be unduly difficult or impossible, 5.4 percent of the population of students enrolled in eighth grade in 1988 were excluded from the base year survey. Exclusion of such individuals from the sampling frame results in significant undercoverage of those subpopulations who are most likely to experience difficulty in school, and to drop out of school. Also, because change over time in eligibility status is possible (for example, a student not proficient in English may become so), excluded students, if their status is not reassessed as an adjunct to the freshening process, undermine the tenth and twelfth grade representativeness of the 1990 and 1992 samples. A followback study of base year ineligibles was therefore undertaken in the first follow-up, to reassess eligibility and ascertain 1990 enrollment status.

Individuals who were found to be capable of completing first follow-up survey forms under normal conditions were "brought back into the study" and surveyed. Individuals who were found to be still incapable of participation were assessed with respect to their enrollment and this information for both newly eligible and ineligible individuals was used to derive an expanded sample national dropout rate for the eighth grade cohort of 1988[5].

NELS:88 First Follow-Up Sample and Analysis Populations

Two objectives guided the first follow-up sampling plan. First, the sample was to include approximately 21,500 students who were in the eighth-grade sample in 1988 (both participants and nonparticipants). Second, the sample was to constitute a valid probability sample of all students currently enrolled in the tenth grade in the 1989-1990 school year. This entailed freshening the sample with students who were tenth graders in 1990 but not in the eighth grade during the 1987-1988 school year. (Figure 3 illustrates the longitudinal sample design of the baseline and follow-up surveys.) The two sampling objectives of the first follow-up produced two primary analytic populations--the NELS:88 eighth grade cohort two years later (1990), and the NELS:88 sophomore cohort of 1990. These first follow-up populations are illustrated below:

[5]For expanded cohort dropout rates reported by respondent gender and race/ethnicity, and by respondent's base year school control type, region and urbanicity, see Kaufman, P., McMillen, M., & Whitener, S.D. (1991). *Dropout Rates in the United States: 1990.* Washington, D.C., National Center for Education Statistics. (NCES 91-053).

ANALYSIS POPULATIONS

PANEL ANALYSIS:
1988 8th Graders
Two Years later

Populations:

Enrolled in school--
tenth grade or
another grade

Not enrolled in school

CROSS-SECTIONAL ANALYSIS
Sophomores in the Spring
Term of 1990

REPEATED CROSS-SECTIONAL ANALYSIS
Sophomores in the Spring
Term of 1990 Compared to
Sophomores in Spring 1980

Populations:

1988 8th Graders in 10th grade in spring term 1990

Freshened students: spring 1990 10th graders who were not 8th graders in the 1987-88 school year. (Added to ensure 1990 NELS:88 10th grade representativeness).

The two primary populations of the first follow-up are the eighth grade longitudinal cohort, for whom two waves of survey data have been gathered, and the 1990 tenth grade sample or the sophomore class of 1990. Although the majority of the members of the sophomore class of 1990 are also members of the eighth grade longitudinal cohort--those eighth grade longitudinal cohort members who were attending tenth grade as of the spring term of 1990--the 1990 sophomore cohort, has only one wave of survey data. It is the eighth grade longitudinal cohort members for whom analyses of change and stability between 1988, as eighth graders, and 1990, as students and dropouts, can be performed. Table 2 presents basic demographic characteristics of the two primary populations of the first follow-up.

The 1990 eighth grade longitudinal cohort represents the population of 3 million adolescents who were enrolled in eighth grade two years ago in 1988. Simply put they are the eighth grade class of 1988. Thus, as in the base year, about half of the 1990 eighth grade longitudinal cohort is male and half female. Similarly, the racial/ethnic composition of this cohort in 1990 is the same as the racial/ethnic composition of this cohort in the base year. As displayed in Table 2, 3.6 percent of the 1990 eighth grade longitudinal cohort are of Asian origin, 10.4 percent are Hispanic, 13.2 percent are black, 71.4 percent are white, and 1.4 percent are American Indian or Alaskan Native.

Table 2
Composition of the eighth grade longitudinal cohort in 1990 and tenth grade cross-sectional cohort, and the freshened student cohort by selected background characteristics

	8th Gr. Cohort	Freshened Students	10th Gr. Cross-section
Total	3,007,812	131,385	2,823,330
Sex			
Male	50.1	55.5	49.9
Female	49.9	44.5	50.1
Race/Ethnicity			
Asian	3.6	5.7	3.9
Hispanic	10.4	21.0	10.2
Black	13.2	22.1	12.5
White	71.4	49.2	72.2
American Indian/ Alaskan Native	1.4	1.9	1.2
Family Composition			
Mother & Father	59.8	45.7	62.4
Mother & Male Guardian	13.3	18.0	12.9
Father & Female Guardian	3.4	3.1	3.3
Mother only	15.5	20.5	14.7
Father only	3.1	3.8	3.1
Other relative or nonrelative	5.0	9.0	3.5
1990 School Type			
Public	90.0	97.4	90.1
Catholic	6.1	1.1	6.0
Independent	1.2	.7	1.2
Other Private	2.7	.7	2.7

Table 2
Composition of the eighth grade longitudinal cohort in 1990 and tenth grade cross-sectional cohort, and the freshened student cohort by selected background characteristics--continued

	8th Gr. Cohort	Freshened Students	10th Gr. Cross-section
Total	3,007,812	131,385	2,823,330
1990 Urbanicity			
Urban	27.8	40.3	28.3
Suburban	56.4	51.9	56.3
Rural	15.8	7.8	15.4
School Enrollment Status			
Enrolled in 10th Grade	89.0	78.4	100.0
Enrolled in Grade other 10th	4.6	NA	NA
Dropout*	6.0	21.5	NA

SOURCE: National Education Longitudinal Study of 1988, First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Note: Owing to rounding, column subcategories may not sum to 100 percent.

* Freshened dropouts are not included in the figures reported above, which deal with freshened sample members who are part of the NELS:88 sophomore cohort, that is, were enrolled in tenth grade in the spring term of 1990. Nonetheless, the weighted dropout rate for the students brought in through freshening was, between the autumn and spring terms of the 1989-90 school year, 21.5 percent.

As of spring 1990, 89 percent of the eighth grade longitudinal cohort were enrolled in tenth grade, close to 5 percent were enrolled in a grade other than tenth (either held back or promoted ahead of their class)[6] and 6 percent had dropped out (more will be said on this group later in this section). It is this vast majority of the 1990 eighth grade cohort members (89%)--those who were in enrolled in tenth grade as of spring 1990--who make up the largest portion of the 1990 tenth grade cross-sectional cohort.

[6] For the 5 percent of eighth grade cohort members who had fallen out of modal grade progression, measures were not taken for separately reporting who had been held back and who had been accelerated. It is certain, however, that by far the greatest numbers of these individuals were grade retained rather than double promoted.

The 1990 tenth grade cross-sectional cohort represents the more than 2.8 million students who, in the spring of 1990, were sophomores. The first follow-up sophomore class of 1990 comprises those members of the eighth grade longitudinal cohort who were sophomores in 1990 and freshened students. In order to obtain a nationally representative tenth grade cross-sectional cohort, 1990 sophomores not represented by eighth grade longitudinal cohort members who were sophomores, that is, students who were not in eighth grade in the U.S.A. two years ago but who were in tenth grade as of the spring of 1990--were added to the study. Table 2 presents descriptive statistics on the freshened student cohort.

Although freshened students comprise only 4.7 percent of the tenth grade cross-sectional cohort, they differ strikingly from both 1990 eighth grade longitudinal cohort members and 1990 sophomores. Unlike other first follow-up cohort members, the majority (51%) of freshened students are minority (compared to 29% of the eighth grade longitudinal cohort and 28% of 1990 sophomores), male (56 percent versus 50 percent both for the eighth grade longitudinal cohort and tenth grade cross-sectional cohort); and live in a non-traditional family arrangement (only 46% of freshened students live with their mother and father; approximately 60% of other cohorts members live with their mother and father). In many ways freshened students resemble the demographic profile of early NELS:88 dropouts, the majority of whom have also repeated a grade,[7] and live in a non-traditional family arrangement (only 26% live with their mother and father).

Freshened cohort members are students who were not in eighth grade in the United States two years ago but were enrolled in the tenth grade as of the spring of 1990. The most frequently reported reason for not attending eighth grade in 1988 was being retained a grade (65%)[8], followed by "in another country" (19%), unknown (12%), and accelerated (2%). Being retained a grade is also characteristic of Limited English Proficient (LEP) students; and, LEP students represent 17 percent of the first follow-up freshened cohort. Freshened cohort students may be students who are at risk of dropping out. However, dropouts and freshened students differ on several key characteristics which may operate to lessen the likelihood of dropping out.

[7]Of all eighth grade longitudinal cohort dropouts, 61.2 percent have repeated at least one grade.

[8]Freshening reasons are reported as raw percents of the sample, rather than as weighted population estimates.

Additional NELS:88 Follow-Ups

The **second follow-up** took place early in **1992**, when most sample members were second term seniors. The second follow-up provides a culminating measurement of learning in the course of secondary school, and also collects information that will facilitate investigation of the transition into the labor force and postsecondary education after high school. The NELS:88 second follow-up resurveyed students who were identified as dropouts in 1990, and identified and surveyed those additional students who had left school since the prior wave. Second follow-up data will be released early in 1993. The NELS:88 **third follow-up** will take place in **1994**, when most sample members will have left high school. The primary goals of the 1994 round will be to provide for trend comparisons with NLS-72 and HS&B, and to address issues of employment and postsecondary access and choice. Additionally, the third follow-up will provide a basis for assessing how many dropouts have returned to school and by what route, and for measuring the access of dropouts to vocational training programs and to other educational opportunities. A **fourth follow-up** is scheduled for **1997**.

Availability of NELS:88 Data

NELS:88 base year and first follow-up data files are available both on magnetic tape and CD-ROM. The CD-ROM storage medium includes a DOS-based electronic codebook with search and retrieval software for use with SAS-PC or SPSS-PC+. Data files may be ordered directly from the United States Department of Education (contact the Office of Educational Research and Improvement, Data Systems Branch, 555 New Jersey Avenue NW, Washington, DC 20208-5725; 202/219-1547).

Because multilevel microdata carries with it some risk of the possibility of statistical disclosure of institutions or individual identities, the NELS:88 data have been extensively analyzed to determine which items of information, used alone or in conjunction with other key variables, have significant disclosure potential. Variables that were found to pose significant disclosure risks have been suppressed or altered to remove or substantially reduce these risks. For example, in some cases, continuous variables have been recast as categorical variables, or fine-grained categorical variables have been more grossly categorized.

While considerations of confidentiality require these alterations of the data, it is recognized that some of these protections against disclosure may at times reduce the analytic potential of certain variables in the data set. For this reason, NCES also makes **privileged use data files** available to qualified researchers with a proven need for the data in its privileged use form. To obtained the privileged use data, it is necessary for an organization to obtain a licensure agreement from NCES. The agreement must be signed by the principal investigator and by someone authorized to commit the organization to the legal requirements. In addition, each professional or technical staff member with access to the data must sign and have notarized an affidavit of nondisclosure. Institutionally-based researchers may apply to the Associate Commissioner of Education Statistics at the Statistical Standards and Methodology Division, National Center for Education Statistics (NCES), 555 New Jersey Avenue NW, Washington, D.C. 20208-5651, if they wish to pursue the possibility of obtaining access to the NELS:88 privileged use data files.

APPENDIX D: Summary Cross-Tabulations for Tested Achievement in Science, Reading and Social Studies: Estimates, Standard Errors and Sample Sizes

Note: In the following tables, "s.e." stands for Standard Error, and "unwt n" stands for the unweighted (sample) N (number) of cases used in this analysis.

Table D.1:
Science Test Quartile by Background Characteristics, Coursework and Instructional Factors

Test Quartile:	Lowest quartile	Second quartile	Third quartile	Highest quartile
Race/Ethnicity				
Asian	21.6%	21.0%	26.8%	30.5%
Hispanic	38.0	30.8	20.9	10.3
Black	48.6	30.0	14.5	7.0
White	16.5	22.2	29.4	31.8
American Indian	37.0	39.3	10.9	12.9
School Control				
Public	24.1%	24.4%	26.2%	25.4%
Catholic	12.2	23.2	31.8	32.8
Independent (NAIS)	6.7	7.9	15.9	69.5
Other private	13.6	25.5	29.4	31.5
Socioeconomic Status				
Lowest quartile	40.9%	30.6%	18.5%	10.1%
Second	27.0	26.6	27.3	19.1
Third	18.3	25.5	29.2	27.1
Highest quartile	8.3	16.0	29.8	45.9
Gender				
Male	20.8%	20.5%	26.7%	32.0%
Female	25.2	27.7	26.2	21.0
Science Coursework Level[1]				
Low	48.3%	26.5%	16.9%	8.3%
Middle	22.6	25.7	27.8	23.9
Advanced	14.5	15.6	23.8	46.0
Write Reports of Lab Work in Science				
Very rarely	27.2%	26.8%	27.0%	18.9%
Once a month	19.2	24.4	26.8	29.7
Once a week or more	18.0	21.5	27.1	33.5

[1]Using F1S23 from the student questionnaire, sophomores with one year or more in chemistry or physics were classified as being in the advanced science group. The middle group comprised individuals who did not qualify for the high group but reported taking one year or more of the following classes: biology, general science, physical science, earth science, or other science. Finally, the low coursework group consisted of all remaining sophomores (including those enrolled in principles of technology).

Table D.1:
Science Test Quartile by Background Characteristics, Coursework and Instructional Factors (continued)

	Lowest quartile	Second quartile	Third quartile	Highest quartile
PERCEIVED CURRICULAR AND INSTRUCTIONAL EMPHASIS:				
Science Facts/Rules Emphasis				
None	37.5%	29.3%	20.0%	13.2%
Minor emphasis	26.5	23.9	24.5	25.2
Moderate emphasis	19.0	23.6	28.4	29.1
Major emphasis	17.5	23.4	28.2	31.0
Science problem-solving Emphasis				
None	28.4%	24.4%	25.0%	22.1%
Minor emphasis	22.5	23.0	28.3	26.2
Moderate emphasis	19.0	25.7	26.9	28.5
Major emphasis	19.9	22.2	26.7	31.1

Note: owing to rounding, rows may not sum to 100 percent.

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table D.2:
Social Studies and Reading Achievement

Table D.2a: Social Studies Test Quartile by Background Characteristics and Instructional Factors

	TEST QUARTILE:			
	Lowest quartile	**Second quartile**	**Third quartile**	**Highest quartile**
BACKGROUND CHARACTERISTICS				
Race/Ethnicity				
Asian	21.6%	24.2%	23.6%	30.6%
Hispanic	37.0	27.0	24.3	11.7
Black	36.3	32.0	21.6	10.1
White	17.9	23.1	27.5	31.5
American Indian	48.4	17.3	23.4	11.0
School Control				
Public	23.6%	25.3%	25.9%	25.3%
Catholic	11.4	18.7	33.2	36.7
Independent (NAIS)	8.4	9.0	16.0	66.6
Other private	15.0	18.8	30.3	35.9
Socioeconomic Status				
Lowest quartile	39.9%	29.8%	18.8%	11.5%
Second	25.6	28.0	25.8	20.6
Third	19.1	24.5	30.1	26.4
Highest quartile	8.3	17.2	29.0	45.5
Gender				
Male	22.2%	20.8%	25.2%	31.8%
Female	22.9	28.3	27.2	21.7
INSTRUCTIONAL DEMAND:				
Asked to Show Understanding in Social Studies				
Not taking*	24.3%	27.1%	27.3%	21.3%
Never	28.7	27.2	22.2	21.9
Less than once a week	19.8	23.9	25.8	30.5
About once a week	17.5	21.3	28.4	32.8
A few times a week	19.5	22.9	27.9	29.7
Almost every day	20.6	22.7	25.0	31.7

*26.4 percent are not taking social studies as sophomores

Note: Owing to rounding, rows may not sum to 100 percent.

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table D.2b:
Reading Test Quartile by race, school control type, SES, sex, and instructional demand to demonstrate understanding

	TEST QUARTILE:			
	Lowest quartile	**Second quartile**	**Third quartile**	**Highest quartile**
Race/Ethnicity				
Asian	21.4%	24.9%	25.7%	28.0%
Hispanic	33.3	30.6	24.0	12.1
Black	38.5	28.8	20.9	11.8
White	18.4	22.8	27.5	31.3
American Indian	48.0	28.3	15.8	7.8
School Control				
Public	24.0%	25.5%	25.6%	24.9%
Catholic	11.4	18.0	32.3	38.4
Independent (NAIS)	6.8	7.0	22.1	64.1
Other private	13.4	13.0	33.0	40.6
Socioeconomic Status				
Lowest quartile	40.2%	30.1%	19.6%	10.1%
Middle Two quartiles	21.7	26.6	27.7	24.1
Highest quartile	9.9	15.8	28.9	45.5
Gender				
Male	27.3%	24.2%	24.0%	24.4%
Female	18.4	24.7	28.1	28.8
INSTRUCTIONAL DEMAND: **Asked to Show Understanding in English Class**				
Not taking*	30.1%	26.4%	28.0%	15.4%
Never	28.6	26.6	25.6	19.2
Less than once a week	19.1	23.3	27.4	30.2
About once a week	19.9	23.9	27.8	28.5
A few times a week	20.9	26.6	26.1	26.5
Almost every day	25.1	22.4	24.6	28.0

*Less than 1 percent of the sample was not enrolled in sophomore English.

Note: Owing to rounding, rows may not sum to 100 percent.

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table D.3:
Reading Proficiency Scores by Background Characteristics, Program, and Homework

	BELOW Level 1	AT Level 1	AT Level 2
TOTAL	10.7	39.2	50.1
Race/Ethnicity			
Asian	10.3	38.8	50.9
Hispanic	14.7	51.0	34.3
Black	19.6	46.5	33.9
White	8.3	36.2	55.5
American Indian	22.2	57.0	20.8
School Control			
Public	11.2	40.4	48.4
Catholic	4.7	29.2	66.1
Independent (NAIS)	5.2	15.7	79.2
Other private	7.9	28.7	63.4
Socioeconomic Status			
Lowest quartile	18.5	50.5	31.0
Second Quartile	12.5	44.3	43.2
Third quartile	8.4	37.8	53.8
Highest quartile	4.4	26.7	68.9
Gender			
Male	12.9	40.2	46.9
Female	8.5	38.3	53.2
High School Program			
General	10.0	42.8	47.1
Academic	4.5	27.4	68.1
Vocational/Technical	20.7	53.2	26.1
Other or Don't Know	19.8	47.4	32.8
Hours of Homework Per Week			
None	32.5	47.8	19.6
Up to 2 hours	15.8	47.1	37.1
2 to 5 hours	11.5	42.0	46.6
More than 5 hours	7.3	34.3	58.4

KEY: **Reading Level 1**--Simple reading comprehension including reproduction of detail and/or the author's main thought. **Reading Level 2**--Ability to make inferences beyond the author's main thought and/or understand and evaluate relatively abstract concepts.

Note: Owing to rounding, rows may not sum to 100 percent.

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table D2.5:
Science Test Quartile by background characteristics, opportunity to learn, and instructional factors

		LOWEST QTLE	25-49 %	50-75 %	HIGHEST QTLE
TOTAL	s.e.	0.65	0.59	0.55	0.70
	unwt n	16581	16581	16581	16581
RACE/ETHNICITY					
Asian	s.e.	2.24	2.02	2.16	2.58
	unwt n	1084	1084	1084	1084
Hispanic	s.e.	1.86	1.69	1.88	0.95
	unwt n	1931	1931	1931	1931
Black	s.e.	2.61	2.22	1.33	1.27
	unwt n	1597	1597	1597	1597
White	s.e.	0.57	0.65	0.62	0.76
	unwt n	11706	11706	11706	11706
American Indian	s.e.	3.81	5.05	2.32	3.88
	unwt n	191	191	191	191
SCHOOL CONTROL					
Public	s.e.	0.68	0.62	0.58	0.69
	unwt n	14250	14250	14250	14250
Catholic	s.e.	2.09	2.53	2.51	3.05
	unwt n	952	952	952	952
NAIS	s.e.	4.18	2.76	3.54	6.49
	unwt n	983	983	983	983
Other Private	s.e.	2.69	3.44	2.72	4.68
	unwt n	370	370	370	370

Table D2.5:
Science Test Quartile by background characteristics, opportunity to learn, and instructional factors (continued)

SOCIOECONOMIC STATUS:	SCIENCE TEST QUARTILE:				
SES QUARTILE		**Lowest Quartile**	**25-49%**	**50-75%**	**Highest Quartile**
Lowest	s.e.	1.25	1.21	1.02	0.79
	unwt n	3348	3348	3348	3348
Second	s.e.	1.28	1.12	1.16	0.98
	unwt n	3856	3856	3856	3856
Third	s.e.	0.93	1.15	1.19	1.08
	unwt n	3982	3982	3982	3982
Highest	s.e.	0.57	1.04	1.00	1.20
	unwt n	4923	4923	4923	4923
SEX					
Male	s.e.	0.84	0.82	0.76	0.92
	unwt n	8253	8253	8253	8253
Female	s.e.	0.83	0.80	0.77	0.792
	unwt n	8328	8328	8328	8328
SCIENCE COURSE LEVEL					
Low	s.e.	2.61	1.95	1.74	1.17
	unwt n	966	966	966	966
Middle	s.e.	0.68	0.70	0.63	0.69
	unwt n	12554	12554	12554	12554
Advanced	s.e.	1.06	1.03	1.22	1.76
	unwt n	2952	2952	2952	2952
SCIENCE LAB REPORT					
Very rarely	s.e.	1.10	0.89	1.01	0.88
	unwt n	4792	4792	4792	4792
Once a month	s.e.	1.07	1.57	1.17	1.24
	unwt n	3329	3329	3329	3329
Once a week or more	s.e.	0.76	0.87	0.84	1.06
	unwt n	7230	7230	7230	7230

Table D2.5:
Science Test Quartile by background characteristics, opportunity to learn, and instructional factors (continued)

		Lowest Quartile	25-49%	50-75%	Highest Quartile
CLASSROOM EMPHASIS: FACTS AND RULES					
None	s.e.	2.37	2.60	1.81	1.76
	unwt n	1114	1114	1114	1114
Minor Emphasis	s.e.	1.21	1.03	0.97	1.04
	unwt n	3195	3195	3195	3195
Moderate Emphasis	s.e.	0.75	0.82	0.93	1.02
	unwt n	5989	5989	5989	5989
Major Emphasis	s.e.	1.02	1.11	1.01	1.16
	unwt n	5315	5315	5315	5315
CLASSROOM EMPHASIS: PROBLEM SOLVING					
None	s.e.	1.51	1.30	1.29	1.25
	unwt n	1917	1917	1917	1917
Minor Emphasis	s.e.	1.00	0.94	0.94	1.04
	unwt n	3912	3912	3912	3912
Moderate Emphasis	s.e.	0.79	1.08	0.98	1.08
	unwt n	5738	5738	5738	5738
Major Emphasis	s.e.	1.32	1.10	1.23	1.36
	unwt n	4034	4034	4034	4034

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table D2.7:
Social Studies and Reading Achievement
Table 2.7a: Social Studies Test Quartile by Background Characteristics and Instructional Factors

		TEST QUARTILE: Lowest quartile	Second quartile	Third quartile	Fourth quartile
BACKGROUND CHARACTERISTICS					
RACE					
Asian	s.e.	2.36	2.13	2.28	2.24
	unwt n	16492	16492	16492	16492
Hispanic	s.e.	1.74	1.38	1.53	1.01
	unwt n	1908	1908	1908	1908
Black	s.e.	2.16	2.40	2.05	1.31
	unwt n	1587	1587	1587	1587
White	s.e.	0.60	0.66	0.63	0.82
	unwt n	11665	11665	11665	11665
American Indian	s.e.	7.72	3.56	5.73	3.14
	unwt n	186	186	186	186
SCHOOL CONTROL					
Public	s.e.	0.64	0.63	0.58	0.70
	unwt n	14168	14168	14168	14168
Catholic	s.e.	1.88	2.14	2.21	3.15
	unwt n	953	953	953	953
NAIS	s.e.	4.69	2.81	3.12	6.57
	unwt n	976	976	976	976
Other private	s.e.	3.56	2.62	2.84	3.74
	unwt n	369	369	369	369
SOCIOECONOMIC STATUS					
Lowest quartile	s.e.	1.36	1.17	0.97	0.83
	unwt n	3321	3321	3321	3321
Second quartile	s.e.	1.09	1.12	1.23	1.20
	unwt n	3843	3843	3843	3843
Third quartile	s.e.	0.95	1.07	1.12	1.11
	unwt n	3960	3960	3960	3960
Highest quartile	s.e.	0.60	1.10	1.05	1.32
	unwt n	4900	4900	4900	4900

Table D2.7a:
Social Studies and Reading Achievement (continued)

		Lowest quartile	Second quartile	Third quartile	Fourth quartile
SEX					
Male	s.e.	0.73	0.82	0.75	0.99
	unwt n	8208	8208	8208	8208
Female	s.e.	0.86	0.79	0.77	0.76
	unwt n	8284	8284	8284	8284
INSTRUCTIONAL DEMAND: ASKED TO SHOW UNDERSTANDING IN SOCIAL STUDIES					
Not taking	s.e.	0.99	1.00	0.94	0.88
	unwt n	5049	5049	5049	5049
Never	s.e.	1.90	2.13	1.29	1.63
	unwt n	1922	1922	1922	1922
Less than once a week	s.e.	1.30	1.32	1.42	1.71
	unwt n	1856	1856	1856	1856
About once a week	s.e.	1.21	1.20	1.72	1.66
	unwt n	2114	2114	2114	2114
A few times a week	s.e.	1.10	1.90	1.57	1.56
	unwt n	2532	2532	2532	2532
Almost every day	s.e.	1.28	1.31	1.28	1.68
	unwt n	2797	2797	2797	2797

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table D2.7b:
Reading Test Quartile by race, school control type, SES, sex, and instructional demand to demonstrate understanding

		TEST QUARTILE:			
		Lowest quartile	**Second quartile**	**Third quartile**	**Highest quartile**
Race/Ethnicity					
Asian	s.e.	1.865	2.464	1.998	2.362
	unwt n	1098	1098	1098	1098
Hispanic	s.e.	1.784	1.855	1.643	1.091
	unwt n	1974	1974	1974	1974
Black	s.e.	2.401	1.950	1.753	1.648
	unwt n	1621	1621	1621	1621
White	s.e.	0.625	0.581	0.635	0.708
	unwt n	11749	11749	11749	11749
American Indian	s.e.	7.563	5.068	3.357	2.977
	unwt n	190	190	190	190
School Control					
Public	s.e.	0.659	0.577	0.564	0.628
	unwt n	14370	14370	14370	14370
Catholic	s.e.	1.688	1.986	2.816	3.097
	unwt n	949	949	949	949
NAIS	s.e.	4.164	2.585	4.753	6.990
	unwt n	991	991	991	991
Other private	s.e.	3.011	2.345	3.528	4.146
	unwt n	367	367	367	367
Socioeconomic Status					
Lowest quartile	s.e.	1.282	1.092	0.927	0.712
	unwt n	3405	3405	3405	3405
Middle Two quartiles	s.e.	0.771	0.777	0.800	0.790
	unwt n	7886	7886	7886	7886
Highest quartile	s.e.	0.899	0.793	1.076	1.112
	unwt n	4937	4937	4937	4937

Table D2.7b:
Reading Test Quartile by race, school control type, SES, sex, and instructional demand to demonstrate understanding (continued)

		TEST QUARTILE:			
		Lowest quartile	**Second quartile**	**Third quartile**	**Highest quartile**
Gender					
Male	s.e.	0.877	0.801	0.746	0.773
	unwt n	8311	8311	8311	8311
Female	s.e.	0.765	0.682	0.762	0.843
	unwt n	8392	8392	8392	8392
INSTRUCTIONAL DEMAND: Asked to Show Understanding in English Class					
Not taking[a]	s.e.	5.306	5.159	7.161	3.248
	unwt n	137	137	137	137
Never	s.e.	1.623	1.250	1.266	1.159
	unwt n	2177	2177	2177	2177
Less than once a week	s.e.	1.022	1.157	1.245	1.369
	unwt n	2745	2745	2745	2745
About once a week	s.e.	1.093	1.086	1.246	1.383
	unwt n	2952	2952	2952	2952
A few times a week	s.e.	1.133	1.291	1.114	1.146
	unwt n	4113	4113	4113	4113
Almost every day	s.e.	1.216	0.916	1.040	1.142
	unwt n	4401	4401	4401	4401

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table D2.8:
Reading Proficiency Scores by Various Characteristics

Percentage of 1990 Sophomores at Each Proficiency Level		Below Level 1	Level 1	Level 2
TOTAL	s.e.	0.58	0.91	0.93
	unwt n	16538	16538	16538
GENDER				
Male	s.e.	0.89	1.30	1.32
	unwt n	8225	8225	8225
Female	s.e.	0.73	1.28	1.31
	unwt n	8313	8313	8313
RACE/ETHNICITY				
Asian	s.e.	2.21	3.54	3.64
	unwt n	1089	1089	1089
Hispanic	s.e.	1.93	2.72	2.59
	unwt n	1941	1941	1941
Black	s.e.	2.39	3.00	2.85
	unwt n	1589	1589	1589
White	s.e.	0.61	1.07	1.10
	unwt n	11662	11662	11662
American Indian	s.e.	7.31	8.71	7.14
	unwt n	186	186	186
SOCIOECONOMIC STATUS				
Low quartile	s.e.	1.61	2.08	1.92
	unwt n	3341	3341	3341
Second quartile	s.e.	1.28	1.92	1.92
	unwt n	3846	3846	3846
Third quartile	s.e.	1.06	1.85	1.90
	unwt n	3963	3963	3963
High quartile	s.e.	0.70	1.51	1.58
	unwt n	4919	4919	4919

Table D2.8:
Reading Proficiency Scores by Various Characteristics
(continued)

Percentage of 1990 Sophomores at Each Proficiency Level		Below Level 1	Level 1	Level 2
SCHOOL CONTROL				
Public	s.e.	0.63	0.99	1.01
	unwt n	14220	14220	14220
Catholic	s.e.	1.66	3.56	3.71
	unwt n	940	940	940
NAIS	s.e.	1.69	2.77	3.10
	unwt n	991	991	991
Other Private	s.e.	3.40	5.72	6.08
	unwt n	361	361	361
HIGH SCHOOL PROGRAM				
General HS Program	s.e.	0.88	1.46	1.47
	unwt n	6634	6634	6634
Academic Program	s.e.	0.64	1.39	1.45
	unwt n	5968	5968	5968
Vocational, Technical	s.e.	2.55	3.13	2.76
	unwt n	1461	1461	1461
Other Program, Don't know	s.e.	2.07	2.60	2.44
	unwt n	2128	2128	2128
HOURS OF HOMEWORK PER WEEK				
None	s.e.	7.33	7.82	6.22
	unwt n	235		
Up to 2 hours	s.e.	1.69	2.32	2.24
	unwt n	2675	2675	2675
2 to 5 hours	s.e.	1.09	1.68	1.70
	unwt n	4953	4953	4953
> 5 HOURS	s.e.	0.68	1.24	1.28
	unwt n	8501	8501	8501

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

APPENDIX E: Bibliography and abstracts for OERI NELS:88 Analysis Reports

APPENDIX E

OERI NELS:88 Analysis Reports, Tabulations and Statistical Briefs: Listing and Content Abstract

LISTING OF PUBLICATIONS

1. Hafner, A., Ingels, S.J., Schneider, B., and Stevenson, D.L. ***A Profile of the American Eighth Grader***, 1990; NCES 90-458.

2. Rasinski, K.A., and West, J. ***NELS:88: Eighth Graders' Reports of Courses Taken During the 1988 Academic Year by Selected Student Characteristics***, 1990; NCES 90-459.

3. Hoachlander, E.G. ***A Profile of Schools Attended by Eighth Graders in 1988***, 1991; NCES 91-129.

4. Rock, D.A., Pollack, J.M., and Hafner, A. ***The Tested Achievement of the National Education Longitudinal Study of 1988 Eighth-Grade Class***, 1991; NCES 91-460.

5. Kaufman, P., and Rasinski, K.A. ***Quality of Responses of Eighth-Grade Students to the NELS:88 Base Year Questionnaire***, 1991; NCES 91-487.

6. McMillen, M. ***Eighth to Tenth Grade Dropouts***, 1992; Statistics in Brief series, NCES 92-006.

7. Owings, J.A., and Peng, S. ***Transitions Experienced by 1988 Eighth Graders***, 1992. NCES 92-023.

8. Kaufman, P., and Bradby, D. ***Characteristics of At-Risk Students in NELS:88***, 1992; NCES 92-042.

9. Bradby, D. ***Language Characteristics and Academic Achievement: A Look at Asian and Hispanic Eighth Graders in NELS:88***, 1992; NCES 92-479.

10. Horn, L., and Hafner, A. ***A Profile of American Eighth-Grade Mathematics and Science Instruction***, 1992; NCES 92-486.

11. Horn, L., and West, J. ***A Profile of Parents of Eighth Graders***, 1992; NCES 92-488.

12. Green, P.J. ***High School Seniors Look to the Future, 1972 and 1992***, 1993; Statistics in Brief series, NCES 93-473.

13. McMillen, M., Hausken, E., Kaufman, P., Ingels, S., Dowd, K., Frankel, M. and Qian, J. ***Dropping Out of School: 1982 and 1992***, Issue Brief series, 1993; NCES 93-901.

14. Rasinski, K.A., Ingels, S.J., Rock, D.A., and Pollack, J. ***America's High School Sophomores: A Ten Year Comparison, 1980 - 1990***, 1993; NCES 93-087.

15. Rock, D.A., Owings, J.A., and Lee, R. ***Changes in Math Proficiency Between Eighth and Tenth Grades***. Statistics in Brief series, 1994, NCES 93-455.

16. Finn, J.D. ***School Engagement and Students At Risk.*** 1993; NCES 93-470.

17. Rasinski, K.A. ***The Effect of High School Vocational Education on Academic Achievement Gain and High School Persistence: Evidence from NELS:88***, 1994; Report to the Office of Research, U.S. Department of Education.

18. Ingels, S.J., Plank, S.B., Schneider, B., and Scott, L.A. ***A Profile of the American High School Sophomore in 1990,*** NCES, 1994; NCES 94-086.

19. Myers, D., and Heiser, N. ***Students' School Transition Patterns between Eighth and Tenth Grades Based on NELS:88,*** forthcoming 1994; NCES 94-137.

20. Green, P.J., Dugoni, B.L., Ingels, S.J., and Camburn, E. ***A Profile of the American High School Senior in 1992***, NCES, forthcoming, 1994; NCES 94-384.

21. Scott, L.A., Rock, D.A., Pollack, J.M., and Ingels, S.J. ***Two Years Later: Cognitive Gains and School Transitions of NELS:88 Eighth Graders***, 1994, NCES 94-436.

22. Green, P.J., Dugoni, B.L., and Ingels, S.J. ***Trends Among High School Seniors, 1972 - 1992.*** NCES, forthcoming, 1994; NCES 94-380.

ABSTRACTS[1]

1. Hafner, A., Ingels, S.J., Schneider, B., and Stevenson, D.L. ***A Profile of the American Eighth Grader***, 1990; NCES 90-458.

   Descriptive statistics and associated analysis on American eighth graders are presented based on data from the 1988 National Education Longitudinal Study. The study will be repeated with the same cohort at 2-year intervals. Study variables cover attitudes, school performance, and activities of the eighth-grade students. In addition to direct student data, the study design incorporates data from students' school principals, parents, and teachers to identify additional factors that affect student achievement. In addition to a general statistical profile of the target population, statistics and accompanying analyses cover mathematics and reading performance, at-risk issues, school safety and climate, and high school and college plans. Focus is on circumstances under which children flourish and succeed. The study included a clustered, stratified national probability sample of about 800 public and 200 private schools. Almost 25,000 students participated in the base-year study. The sample represents the nation's eighth-grade population, totalling about 3 million eighth-graders in over 38,000 school in the spring of 1988. Results reveal that the American eighth-grade population is very diverse. One out of every five students is unable to perform basic arithmetic tasks, and 14% of the students are unable to perform basic reading comprehension tasks. Pertinent methodological discussions and associated data are appended. (Fifteen graphs and 69 data tables are included; 66p.)

2. Rasinski, K.A., and West, J. ***NELS:88: Eighth Graders' Reports of Courses Taken During the 1988 Academic Year by Selected Student Characteristics***, 1990; NCES 90-459.

   This set of tables examines self-reports of coursework taken by a national probability sample of eighth graders in public and private schools in the United States. Statistics were obtained from the base-year student survey of the National Education Longitudinal Study of 1988 (NELS:88). Estimates in the tables are based on a sample of 24,599 students in 1,052 schools across the nation. Technical notes follow 45 pages of tables. Three basic sets of tables on self-reported course-taking are provided in the areas of: (1) mathematics, science, and computer education (Tables 1.1 to 1.5); (2) English, foreign language, history, social studies, and religion (Tables 2.1 to 2.5); and (3) arts, vocational education, and personal development (Tables 3.1 to 3.5). Within each set of tables, the first table shows course-taking across all schools. Subsequent tables show course-taking for public, Catholic, independent private, and other private schools. In addition to information about the sample, the technical notes contain information about survey design, response rates, variables used in the tables, and methods for estimating standard errors. An appendix contains standard errors of estimates and unweighted sample sizes for levels of classification variables. (68 p.)

[1]Abstracts are taken from ERIC when available, otherwise from the NELS:88 bibliography maintained by NORC under the NELS:88 third follow-up contract.

3. Hoachlander, E.G. ***A Profile of Schools Attended by Eighth Graders in 1988***, 1991; NCES 91-129.

   As part of the National Education Longitudinal Study of 1988 (NELS:88), this study examined the schools attended by eighth-graders in 1988, the year during which the more than 25,000 eighth-graders of the cohort were first studied. NELS:88 provides information on 802 public schools, 105 Catholic schools, 68 other religious schools, and 60 private, non-religious schools. Throughout the report, the unit of analysis is the school rather than students or teachers. Most of the school data were provided by school administrators. The data are used to develop a profile of the schools attended by eighth- graders, with information about various aspects of the learning environment, school policies and programs, and administrators' assessments of school climate. In 1988, 87.9% of eighth-graders attended public schools, 7.6% attended Catholic schools, 2.9% attended other religious schools, and 1.5% attended private non-religious schools. The study shows that eighth-graders learned under a wide range of different conditions in both public and private schools. Fifty-six data tables and five graphs are included. Appendices contain technical notes, information about the accuracy of estimates and procedures, standard errors and unweighted "N"s, and 56 additional tables. (119 p.)

4. Rock, D.A., Pollack, J.M., and Hafner, A. ***The Tested Achievement of the National Education Longitudinal Study of 1988 Eighth-Grade Class***, 1991; NCES 91-460.

   Sixty tables are presented, which examine the test achievement of a national probability sample of eighth graders in public and private schools. Statistics were obtained from the base-year student survey of the National Education Longitudinal Study of 1988 (NELS:88). Its purpose is to provide policy-relevant data concerning the effectiveness of schools, curriculum paths, special programs, variations in curriculum content, and/or mode of delivery in bringing about educational growth. The NELS:88 test battery includes four tests: (1) reading comprehension; (2) mathematics; (3) science; and (4) history/citizenship/government. This report is a tabular summary of achievement test scores for approximately 24,000 eighth graders from 1,052 schools. Results are grouped into: student background variables; parental involvement variables; and school characteristics and school climate. Reading and mathematics tables contain, in addition to mean scores, the percentage of each group scoring at each proficiency level and the standard error of the percentage estimate. Effect sizes are included to compare group differences. Technical notes on survey design, response rates, variables in the tables, significance testing, and methods for estimating standard errors and effect sizes follow the tables. (122 p.).

5. Kaufman, P., and Rasinski, K.A. ***Quality of Responses of Eighth-Grade Students to the NELS:88 Base Year Questionnaire***, 1991; NCES 91-487.

   This report presents results of an examination of the quality of responses of eighth-grade students to a subset of variables available in the NELS:88 database. The quality of the data was assessed several ways. The correspondence between parent and student responses to similar items on the similar items on the survey instruments was examined. When data were available, the study examined consistency among responses to related items. Finally, the reliability of several scales created from NELS:88 data was assessed. The indicators of data quality suggest that NELS:88 data display a high degree of accuracy and consistency, comparing favorably with responses from the prior NCES longitudinal study, High School and Beyond Study (HS&B). The quality of

student responses to items common to both studies was somewhat less for NELS:88 eighth-graders than for HS&B high school sophomores and seniors, with quality increasing with age, and, as expected from prior research, with reading ability and socioeconomic status. There are 39 tables of NELS:88 data and 2 illustrative bar graphs. (119 p.)

6. McMillen, M. ***Eighth to Tenth Grade Dropouts***, 1992; Statistics in Brief series, NCES 92-006.

This report presents data from the 1988 National Education Longitudinal Study (NELS:88), which started with an eighth-grade cohort and aimed to provide data on dropout experiences as students made the transition into high school and to examine the contextual school and family factors associated with dropping out. The report explains the parameters of the study, the survey methodology, and the data reliability. The data are presented in the following bar graphs: (1) 8th to 10th grade cohort dropout rates by race/ethnicity and sex; (2) 8th to 10th grade cohort dropout rates by region and metropolitan status; and (3) 8th to 10th grade cohort dropout rates by eighth-grade school (public, Catholic, religious private, and non-religious private). (7 p.).

7. Owings, J.A., and Peng, S. ***Transitions Experienced by 1988 Eighth Graders***, 1992. NCES 92-023.

This brief report presents findings regarding two types of transitions experienced by students as they move between the eighth and 10th grades: continuing or dropping out of school and transferring between sectors. While 98% of public school students remained in public schools, over one-third of Catholic school eighth graders and over 25% of National Association of Independent Schools students transferred to public or other private schools. About 6% of all eighth graders were classified as dropouts by spring of their scheduled 10th-grade year. For most students, the move between eighth and 10th grades involves a change of schools and exposure to new educational settings. These transitions may have an impact on student learning and personal development. Consequently, differences in transition patterns and possible outcomes are of major interest. Data were obtained from the base year and first follow-up surveys of the National Education Longitudinal Study of 1988 (NELS:88), which began in 1988 with a sample of 1,052 schools and 24,599 eighth graders. In the spring of 1990, 17,424 students were studied in the first follow-up to determine their education status and progress, and school, community, and work experiences. Four tables present study data, and five graphs illustrate trends from 1988 to 1990. (13 p.).

8. Kaufman, P., and Bradby, D. ***Characteristics of At-Risk Students in NELS:88***, 1992; NCES 92-042.

The study described in this report examined the characteristics of eighth-grade students who were at risk of school failure. The study used data from the National Education Longitudinal Study of 1988, which is a large-scale, national longitudinal study begun in the spring of 1988 when 25,000 eighth graders attending public and private schools across the nation were surveyed along with the students' parents, teachers, and school principals. The students were re-surveyed in 1990, and the base year and follow-up data of NELS:88 taken together provide a wealth of information about eighth graders' as they move in and out of the U.S. school system and into the varied activities of early adolescence. This study, focused on at-risk students within the eighth-grade cohort, examined the following sets of variables: (1) basic demographic characteristics; (2)

family and personal background characteristics; (3) the amount of parental involvement in the student's education; (4) the students' academic history; (5) student behavioral factors; (6) teacher perceptions of the students; and (7) characteristics of the students' schools. Black, Hispanic American, and Native American students and students from low-socioeconomic backgrounds were more likely to be at-risk. Male eighth graders were more likely to have low basic skills, but were no more likely to drop out. After controlling for sex and socioeconomic status, Black and Hispanic American dropout rates were found to be the same as that for Whites. However, even when controlling for sex and economic status, Black and Hispanic American students were more likely than White students to perform below basic proficiency levels. (Included are 15 tables in the text and 31 tables in 2 appendixes; 107 p.).

9. Bradby, D. ***Language Characteristics and Academic Achievement: A Look at Asian and Hispanic Eighth Graders in NELS:88***, 1992; NCES 92-479.

This report examines the demographic and language characteristics and educational aspirations of Asian American and Hispanic American eighth graders and relates that information to their mathematical ability and reading comprehension as measured by an achievement test. Special attention is paid to students who come from homes in which a non-English language is spoken. Of the 1,505 Asian American students evaluated, 73 percent were reported as language minorities (LMs), while 77 percent of the 3,129 Hispanic American students evaluated were LMs. Of the LM students, 66 percent of the Asian Americans had high English proficiency as compared to 64 percent of the LM Hispanic Americans. Both Asian American and Hispanic American groups had 4 percent of LM students showing low English proficiency. Overall, the study found many similarities between the two groups. However, differences are apparent when data are divided along language proficiency, mathematics achievement, aspiration, and other measures. Statistical data are provided in 33 tables and 44 graphs. Appendices present selected survey questions, technical notes and methodology, and 109 standard error tables. (197 p.).

10. Horn, L., and Hafner, A. ***A Profile of American Eighth-Grade Mathematics and Science Instruction***, 1992; NCES 92-486.

This report profiles the mathematics and science instruction received by eighth graders (11,414 eighth graders had teacher reports in mathematics and 10,686 in science) in public and private schools in 1988. A preface lists highlighted findings, tables, and figures included in the document. The body of the report consists of five chapters. Chapter I discusses the purpose and format of the report and limitations of the study. Chapters II and III examine the relationship of various aspects of mathematics and science instruction to students' socioeconomic status and race-ethnicity and type of school attended. Among the aspects examined were the major topics taught, average class size, hours per week attended, allocation of class time, assigned homework, availability of instructional materials, student attitudes toward mathematics and science, and teacher characteristics and qualifications. Chapter IV examines mathematics and science achievement test scores in relation to the various components of instruction measured in the study. Chapter V provides a descriptive profile of the mathematics curriculum, the science curriculum, teacher characteristics and qualifications, classroom characteristics, school type differences, and students' opportunity to learn based on the findings. Appendices that describe the methodology employed and standard errors of estimates reported in tables and figures in the text are provided. (121 p.).

11. Horn, L., and West, J. ***A Profile of Parents of Eighth Graders***, 1992; NCES 92-488.

This report profiles the family characteristics and the level of involvement reported by the parents of 1988 eighth graders, using the base year survey and dropout data from the first follow-up. About 93 percent of the parents of the first year sample were interviewed to provide information about home life and family experiences. This study examined child-directed involvement, including activities such as parent-child discussions and school-directed involvement such as parent-teacher association membership and volunteering in the school. There was some indication that parent involvement was related to whether or not students scored below the basic level in reading or mathematics proficiency, but there was a strong relationship between parent involvement and whether or not a student dropped out of school between the 8th and 10th grades. There are 26 tables and 18 figures presenting study findings. (121 p.).

12. Green, P.J. ***High School Seniors Look to the Future, 1972 and 1992,*** 1993; Statistics in Brief series, NCES 93-473.

In light of the many changes of the past 20 years, it may be expected that plans of high school seniors for further education may have also changed, along with the kinds of jobs they expect to have and the things they regard as important. These questions are examined through data from the National Longitudinal Study of 1972 (NLS-72) and the National Education Longitudinal Study in 1988 (NELS:88), the 1992 Second Follow-Up. The proportion of seniors in academic or college preparatory programs was approximately the same in both years, although enrollment in the general track increased and enrollment in vocational education decreased. In 1992, there was little difference between the sexes in high school program placement. In 1992, only 5.3 of students reported that they would not attend some kind of school after high school, but in 1972, 18.9% had reported that they would not continue. Eighty-four percent in 1992 planned to go to college, compared with the 63% who planned to attend in 1972. Differences for females were dramatic, with female seniors in 1992 four times more likely to plan on graduate or professional school as in 1972. Nearly 60% in 1992 planned a professional career, compared with approximately 45% in 1972. Changes in values were most marked among women, who in 1992 espoused values closer to those traditionally held by men. One figure and three tables present data about the two populations. (6 p.)

13. McMillen, M., Hausken, E., Kaufman, P., Ingels, S., Dowd, K., Frankel, M. and Qian, J. ***Dropping Out of School: 1982 and 1992,*** Issue Brief series, 1993; NCES 93-901.

In recent years, concern over students dropping out of school has increased. A primary focus is the size of the dropout population, a question that has been addressed in two National Center for Education Statistics (NCES) longitudinal studies. Both studies provide the data needed to consider the dropout experiences between the sophomore and senior years of two groups of students a decade apart in time. Over the 10 years between the 1980-82 High School and Beyond survey (HS&B) and the 1990-92 data from the National Education Longitudinal Study of 1988 (NELS:88) (follow-ups), there was a 43 percent reduction in the percent of sophomores who dropped out of school. The NELS:88 rate for the sophomore cohort of 1990 is 6.2 percent. Relative rankings for racial and ethnic groups did not change over the decade, and in both cohorts the dropout rates for Hispanics were higher than those for Whites and Asians. Rates for Blacks

were between those of Hispanic Americans and Whites. In both periods, failure in school and dislike for school were major factors leading students to drop out of school. Pregnancy and marriage were important factors influencing females' decisions to leave school early. Three figures illustrate the discussion. (3 p.)

14. Rasinski, K.A., Ingels, S.J., Rock, D.A., and Pollack, J. ***America's High School Sophomores: A Ten Year Comparison, 1980 - 1990,*** 1993; NCES 93-087.

This study of high school sophomores in 1980 and 1990 compares the experiences of students in the two cohorts, identifying changes in in-school and out-of-school activities, academic achievement, self-concept, values, plans, and aspirations. Similarities and differences between the two groups are documented using data from the National Education Longitudinal Study of 1988 (NELS:88) and High School and Beyond (HS&B, 1980). HS&B and NELS:88 sophomores are marked by basic demographic differences, including the smaller size of the NELS:88 1990 cohort, reflecting the baby bust of the 1970s, and a higher proportion of racial minority and poverty status sophomores in 1990. NELS:88 sophomores also reflect the influence of various waves of school reform since the late 1970s and early 1980s. Overall, the comparison paints a pictures that is in most respects encouraging in its portrayal of the high school academic orientation and postsecondary expectations of the 1990 sophomore class. Positive changes, however, are typically small or moderate in magnitude. Among the findings are: (1) general and college preparatory program placement has increased, at the expense of vocational program placement; (2) patterns of extracurricular participation changed especially in musical activities (31% in 1980 to 22% in 1990) and in hobby clubs (21% in 1980 to 7% in 1990); (3) changes in sophomores giving high importance to particular life values (e.g., marriage and family 83% rating this as very important in 1980, 72% in 1990); (4) small but statistically significant increase in the number of females aspiring to traditionally male-dominated non-professional occupations (15.6% in 1980 versus 18.% in 1990). Sixteen tables and 13 figures present data from the 2 studies. Three appendixes contain information about the survey sample sizes, standard errors, and other methodological and technical information. Appendix A contains an additional 20 data tables. (Contains 46 references; xiv, 98 p.)

15. Rock, D.A., Owings, J.A., and Lee, R. ***Changes in Math Proficiency Between Eighth and Tenth Grades.*** Statistics in Brief series, 1994, NCES 93-455.

This publication illustrates use of the NELS:88 dichotomous proficiency scores for conducting achievement gain analysis (see Scott, Rock, Pollack and Ingels [entry 21] for an illustration of an alternative gain analysis strategy, the use of mathematics probability of proficiency scores). The findings presented in this report suggest that course-taking patterns in mathematics between eighth grade and the sophomore year of high school represent an important factor in explaining growth in math proficiency. For example, even after controlling for eighth-grade math proficiency, higher math gains were associated with course-taking patterns that reflected advanced level math courses. The report also suggests that eighth-grade students who have higher aspirations for postsecondary education are also more likely to show positive math gains. (20 p.)

16. Finn, J.D. ***School Engagement and Students At Risk.*** 1993; NCES 93-470.

To examine the proposition that students who do not remain active participants in class or school may be at risk for school failure, regardless of status characteristics such as ethnicity or family income, two studies of engagement and achievement were conducted. The studies used a nationwide sample of eighth-grade students from the U.S. Department of Education's National Educational Longitudinal Study of 1988 (NELS:88) survey. The first study examined the association of participation in school and classroom activities with academic achievement in 15,737 eighth-graders attending public schools. The study found that participation and academic achievement were positively related, even after controlling for gender, ethnicity, and socioeconomic status. The second study examined behaviors that distinguish students who are at risk, but who are successful in school subjects, from their less successful peers. A sample of 5,945 eighth-graders identified as at risk by virtue of race, home language or socioeconomic status were classified as unsuccessful, passing, or successful, based on reading and mathematics achievement tests. It was found that achievement groups were distinct in terms of variety of classroom participation behaviors, out-of-class participation, and interactions with their parents regarding school. Three major conclusions were drawn from the investigation: (1) behavioral risk factors are indeed related to significant outcomes of schooling; (2) risk behaviors have their roots in the early school years or before; and (3) more attention should be given by educators and researchers to encouraging the potential of "marginal" students. Further research is needed to identify manipulable aspects of classroom and school processes that encourage student engagement. Appendices provide details of the measures used in the studies and the standard deviations and correlations of the measures. Contains 91 references. (117p.).

17. Rasinski, K.A. ***The Effect of High School Vocational Education on Academic Achievement Gain and High School Persistence: Evidence from NELS:88***, 1994; Report to the Office of Research, OERI, U.S. Department of Education.

This analysis of the effects of vocational education on academic achievement and high school persistence was prepared for the National Assessment of Vocational Education. Data from the NELS:88 high school transcript study were analyzed to assess the influence of vocational programs and vocational courses on gains in tested achievement in mathematics, science and reading. The analysis also addresses the issue of whether, regardless of their effect on achievement gain, vocational programs serve to keep students from dropping out of high school.

18. Ingels, S.J., Plank, S.B., Schneider, B., and Scott, L.A. ***A Profile of the American High School Sophomore in 1990***, 1994; NCES 94-086.

This cross-sectional report supplies descriptive analyses of the educational situation of a representative sample of the nation's 1990 sophomores (comprising 1988 eighth-grade cohort members who were in tenth grade in the spring term of 1990 and "freshened" sophomores, students new to the sample who were not in the base year sampling frame, either because they were not 1987-88 eighth graders or not in the United States). *Chapter 1* provides an in-depth view of tenth-grade learning and achievement in mathematics. *Chapter 2* supplies a summary of tenth-grade course-taking patterns and instructional practices in science, reading, social studies, and foreign language. *Chapter 3* explores the tenth grader's life outside of school, including the

process of educational decision making. *Chapter 4* reports on sophomores' plans for the future, including their educational expectations and aspirations. Taken together, these four chapters provide a statistical profile of the American high school sophomore in 1990, which is summarized in *Chapter 5*. Appendices A and B provide technical notes and tables of standard errors of measurement and sample sizes for all reported population estimates. Appendix C contains further information about NELS:88 in general and the first follow-up in particular. Appendix D presents additional tabulations on reading and social studies achievement.

19. Myers, D., and Heiser, N. ***Students' School Transition Patterns between Eighth and Tenth Grades Based on NELS:88,*** forthcoming 1994; NCES 94-137.

Analysis of NELS:88 data makes it possible to explore the relationships between student and family characteristics and the likelihood of shifting among public and private schools as students progress from eighth to tenth grade. This study examines the characteristics of students who switch between sectors (public to private, or private to public) as they move from eighth to tenth grade. Five sets of variables were examined to estimate the association between variations in the students' transition patterns and student and family characteristics: (1) basic student and family background characteristics; (2) the amount of parental involvement in the student's education; (3) the student's academic achievement and educational expectations; (4) the characteristics of the student's school; and (5) parental satisfaction with the student's school. Examination of these characteristics permits four research questions to be addressed: (1) How many students shift between the public and private school sectors? How many students shift from one private school to another?; (2) Who shifts between sectors? Are family background factors, parental involvement, or students' academic achievement or educational expectations associated with variations in transition patterns?; (3) Are school characteristics associated with students' propensity to move between school sectors?; (4) Do parents who are dissatisfied with their children's school shift their children to another type of school?

20. Green, P.J., Dugoni, B.L., Ingels, S.J., and Camburn, E. ***A Profile of the American High School Senior in 1992***, NCES, forthcoming, 1994; NCES 94-384.

This report examines the background of 1992 high school seniors, the school environment which shaped their senior year experiences, the curriculum in which they were enrolled, their academic achievement, their plans and expectations for the future, and their non-academic experiences during this important period of development. *Chapter 1* provides a demographic profile of high school seniors. *Chapter 2* depicts their school and peer environment by recording seniors' perceptions of school, of the safety of their school, and of the values of their peers. *Chapter 3* describes their course and program enrollments. *Chapter 4* examines the tested achievement of 1992 seniors. *Chapter 5* describes their short-term plans--their postsecondary plans, steps they have taken to gain entrance to college, and factors they considered in choosing a postsecondary institution. *Chapter 6* reports on seniors' plans and expectations for the future. Finally, *chapter 7* describes the senior cohort's experiences outside of school--use of illicit drugs and alcohol, television viewing, jobs, participation in school government, and community volunteer work. Taken together, these seven chapters provide a statistical profile of the American high school senior in 1992. Appendices provide unweighted (sample) Ns and standard errors.

21. Scott, L.A., Rock, D.A., Pollack, J.M., and Ingels, S.J. ***Two Years Later: Cognitive Gains and School Transitions of NELS:88 Eighth Graders***, 1994, NCES 94-436.

    This report describes the growth in cognitive skills and achievement, and the continuities and discontinuities experienced in school and at home by the NELS:88 eighth-grade cohort during the two years between the study's base year (1988) and first follow-up (1990) surveys. Four distinct topics are addressed, involving both school dropouts and persisters. (1) By 1990, some 1988 eighth graders were dropouts; this report describes their characteristics and the reasons they gave for dropping out of school. (2) This report presents findings on patterns of school transition--changing from a public eighth-grade school to a private high school or vice versa--and the changes in perception of safety and overall learning environment cohort members experienced after moving from a typically more homogeneous middle school environment to a more heterogeneous high school environment. (3) Additionally, this report summarizes major changes in home life and family, such as the divorce or remarriage of a parent, that also occurred during cohort members' transition to and/or early years of high school. (4) Finally, this report examines the 1988-90 achievement gain of the eighth-grade cohort, thus addressing several basic questions: How much did students gain in achievement in the two years following eighth grade?; Who gained, in what subjects, and (for mathematics) in what way (that is, at what skill or proficiency level)? The analysis of growth in achievement illustrates use of the NELS:88 continuous measure of probability of mathematics proficiency (see Rock, Owings and Lee [1994, entry 15] for an illustration of mathematics achievement gain analysis using NELS:88 dichotomous proficiency scores).

22. Green, P.J., Dugoni, B.L., and Ingels, S.J. ***Trends Among High School Seniors, 1972 - 1992***, NCES, forthcoming, 1994; NCES 94-380.

    This report compares the NLS-72 1972, HS&B 1980, and NELS:88 1992 senior cohorts. It supplies a sociodemographic description of the three senior cohorts. The report compares the cohorts' high school program placement, course-taking and achievement, as well as participation in extracurricular activities. It also compares 1972, 1980 and 1992 seniors' plans for the next year, noting the proportions who planned to work full-time in the year following graduation, the type of postsecondary institution seniors planned to attend, college selection, and major field of study. Finally, the report compares the future educational and occupational aspirations of the three senior cohorts.

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